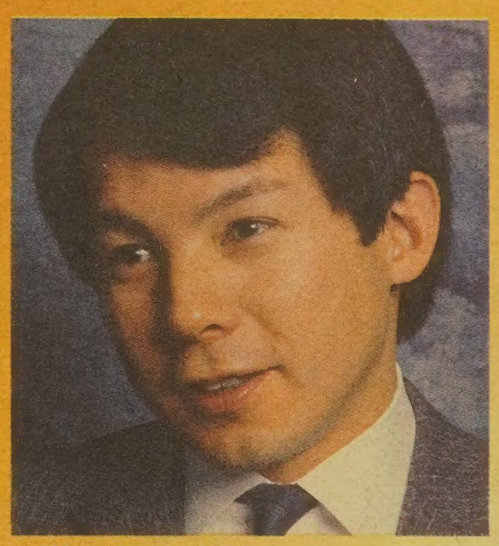
Southern California's Computer Magazine July 23, 1990 • #72 FREE

MICROTIMES™

"In our firm's first six months, we reviewed 160 software companies. We funded three. Even when companies have ideas which may not get financed, we can get people connected the right way…"
—Ann Winblad, Hummer-Winblad Venture Partners

THE CHANGING WORLD OF VENTURE CAPITAL



"Many smaller US companies have grown up to more than $100 million in sales within two or three years. That never happened in Japan. I was curious how they did it, and I found out venture capitalists were backing those entrepreneurs."
—George Hara, DEFTA/Data Control Ltd.

MANAGING DATA IN YOUR BUSINESS

"The rise of SQL has produced a dramatic reorientation of the database market. With the changing competitive landscape, it seems very likely that some of the leading DBMS vendors at the beginning of the decade will no longer be leaders at the end of the decade."

SEE PAGE 31

THE ZENITH MINISPORT

"Little larger than a thick stack of paper, the MinisPort weighs under six pounds and offers a full 25 row by 80 column display. Despite its size, this unit packs a lot of power. It's possible to use this notebook-size computer for desktop-size tasks with little compromise."

SEE PAGE 78

DVORAK'S MAILBAG

"Bill Gates has learned well from IBM how to manipulate a market with Fear, Uncertainty, and Doubt. Mostly the latter two, which is what the Microsoft Windows strategy has been all about in hindsight."

SEE PAGE 134

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• Full Size Case w/200w P/S or Vertical Case • 6/12 MHz Turbo AT Motherboard • 1 MB Zero Wait State RAM On Board Expandable to 4 MB • 8 Expansion Slots Available (5 available) • 0 Wait State • 80287 Coprocessor Socket • 101 Key Enhanced Click Keyboard • Serial, Parallel and Game Ports • 12″ Amber Monochrome Monitor • Hercules Compatible Graphics • 1.2 MB Floppy Drive 5¼″ • 40 MB 28ms Hard Drive • Hard & Floppy Drive Controller • Clock, Calendar w/Battery Backup

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PACER 386-SX
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- 200W Baby AT UL Power Supply (XT size) 55
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- Panasonic KX-1124 (24 pin-200 CPS) 329
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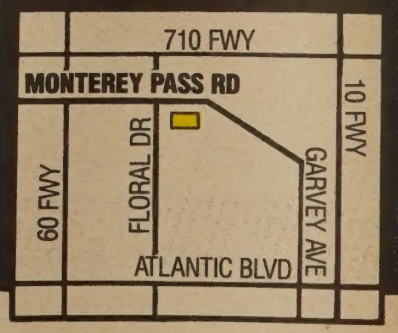

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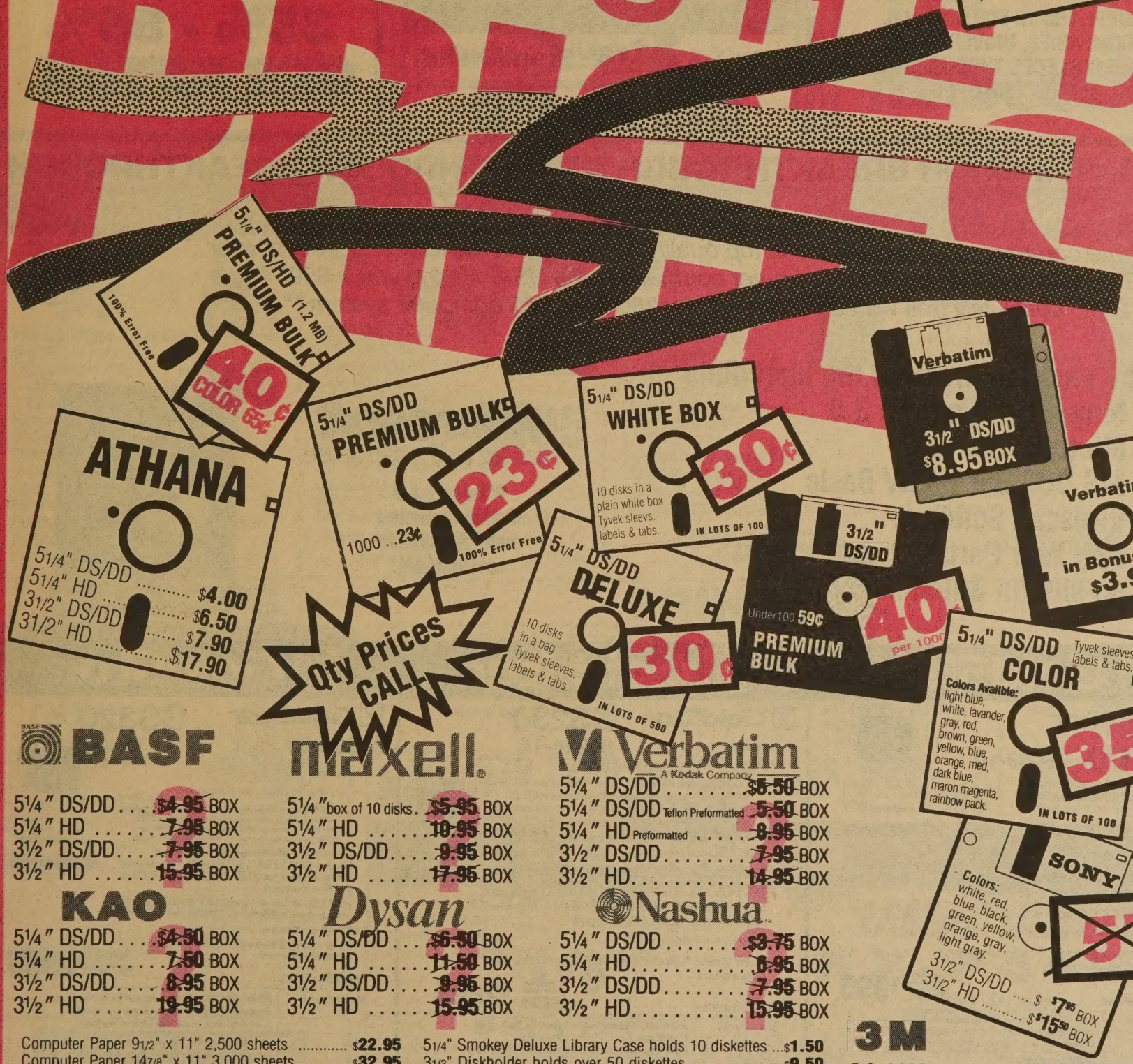

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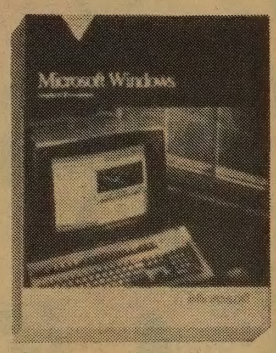
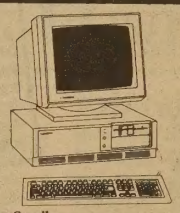


GoldStar GoldStar GoldStar

GoldStar GS100 8088-10

Entry-Level System
IBM PC/XT Compatible



Features

- Second-generation system features:
  Low power consumption (87W), high reliability; Small footprint motherboard; Dual floppy disk controllers; Speed selectable by keyboard or DIP switches
- Front panel power and reset switches
- MS-DOS 3.3 and GW-BASIC
- 101-key enhanced keyboard
- 24-Hr testing of motherboard and system at elevated temperature

SUGG. RETAIL $995

Specifications

Motherboard	8088 - 1 CPU; 10 or 4.77MHz; Socket for 8087; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	640KBytes standard
Disk Storage	Space for 2 H/H 5.25" devices; FDD: Standard one 5.25" 360KByte drive; HDD: Optional
Video	MONOCHROME CARD
Expansion Slots	Four slots
Power Supply	87 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	14.5" x 15.4" x 5.3" (WxDxH)
MONITOR	12' HI-RES AMBER MONITOR

$495

GoldStar GS230 80286-16

Features

- Small footprint system features:
  Dual floppy disk controllers; Three 16-bit and two 8-bit slots; 130W power supply (low power consumption and high reliability); One serial and one parallel port; 1MB memory standard - expandable to 5MB
- Two 5.25" and one 3.5" half-height slots available; HDC LED and power/speed LED
- Front panel power, reset and key-lock switches
- MS-DOS 3.3 and GW-BASIC; LIM-EMS 4.0 support; Shadow RAM for BIOS and video ROM to improve system performance; OS/2 support
- Novell certification
- 24-Hr testing of motherboard and system at elevated temperature

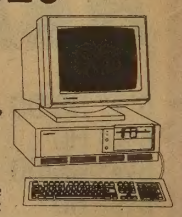
SUGG. RETAIL $2495

Specifications

Motherboard	80286-16 CPU; 16 or 8MHz; Socket for 80287; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	1MBytes standard; Expandable 5MByte on board
Disk Storage	Space for two H/H 5.25" and 1 H/H 3.5" devices; FDD: Standard one 5.25" 1.2MByte drive; HDD: 20 Meg Hard Drive
Video	
Expansion Slots	Five slots (three 16-bit and two 8-bit)
Power Supply	130 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	15.0" x 15.0" x 6.0" (WxDxH)

$995

GoldStar GS320 80386-20



Features

- Small footprint system features:
  Dual floppy disk controllers; One 32-bit, five 16-bit and two 8-bit slots; 1MB memory standard-expandable to 2MB; One serial and one parallel port; Speed switchable by keyboard or setup program (8/20); 200W power supply
- Three half-height storage devices available; Shadow RAM for BIOS and video ROM to improve system performance; LIM-EMS 4.0 support; OS/2 and Novell support
- HDC LED and power/speed LED; Front-panel reset and key-lock switches; MS-DOS 3.3 and GW-BASIC
- Novell certification
- 24-Hr testing of motherboard and system at elevated temperature

SUGG. RETAIL $3995

Specifications

Motherboard	80386 - 20 CPU; 20MHz; Socket for 80387; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	1MBytes Standard; Expandable to 2MByte on board; Expandable to 10MByte high speed memory with RAM board
Disk Storage	Space for 3 H/H 5.25" devices; FDD: Standard one 5.25" 1.2MByte drive; HDD: 65 MB Hard Drive
Video	14" VGA Color Monitor & Card
Expansion Slots	Eight slots (one 32-bit, five 16-bit and two 8-bit)
Power Supply	200 Watts, 115V
Keyboard	101 key keyboard
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	18.5" x 16.0" x 6.1" (WxDxH)

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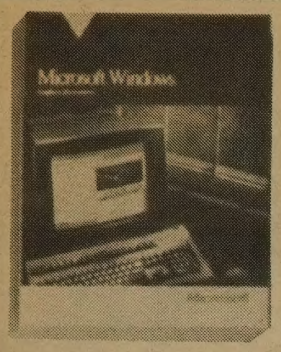

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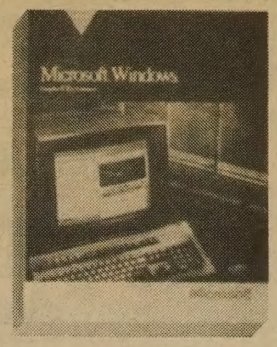

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0 WAIT STATE

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65 Meg Hard Drive
16 Bit VGA Card
14" VGA Color Monitor w/card
Enhanced 101 Keyboard
2 Serial, Parallel, Clock
One Year Limited Warranty Parts & Labor

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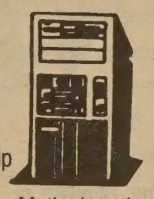
80386-33*

0 WAIT STATE



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386-33
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Expandable to 16 MB on Motherboard
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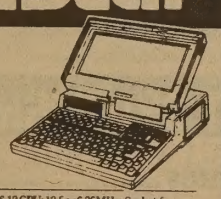
GS 500

Laptop Computer
IBM PC/AT Compatible



Specifications	
Motherboard	80286-12 CPU; 12.5 or 6.25MHz; Socket for 80287; Dual floppy controller; One serial and one parallel port; Real time clock with battery back-up
RAM	640 KBytes standard; Expandable to 2.64 MByte on board
Disk Storage	Space for two 3.5" devices; FDD: Standard one 3.5" 1.44 MByte drive; HDD: Standard 20 MByte drive
Video	High resolution gas plasma with four grey scales; 640 x 400 graphics; 80 x 25 high resolution character; External EGA/CGA/ Hercules video connector
Expansion Slots	One slot for internal modem, proprietary
Power Supply	70 Watts, 115V
Keyboard	83 key keyboard; Optional external numeric 10 key pad
System Software	MS-DOS 3.3/GW-BASIC; Phoenix ROM BIOS
Dimensions	13.0" x 13.4" x 3.9" (WxDxH)

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- Real time clock/calendar with battery back-up
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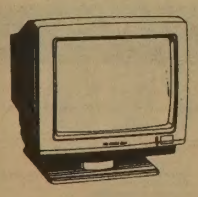

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CITIZEN Color On Command

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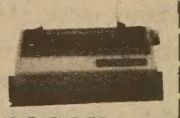

NX1000II

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- Paper Parking
- IBM/Epson compatibility
- Friction/push tractor feed

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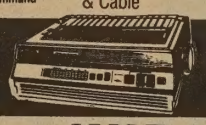

KXP1180i

- 192 CPS draft/38 CPS LQ
- 4 built-in NLQ fonts
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- Auto load & paper parking
- 2 year limited warranty

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- 192 CPS draft/63 CPS LQ
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- 2 year limited warranty

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- 192 CPS draft/63 CPS LQ
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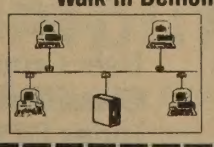

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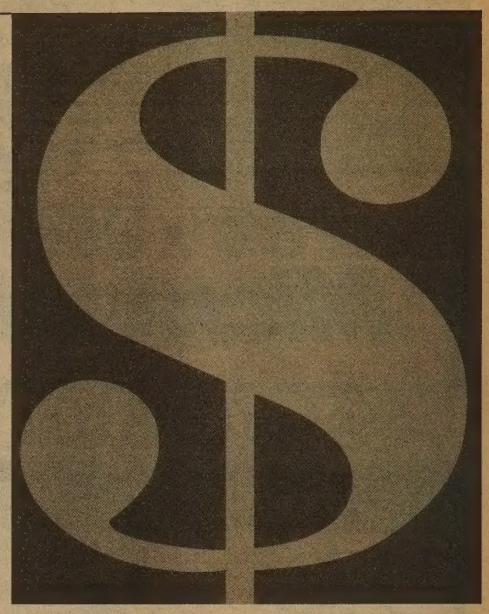

A NOTE FROM THE EDITORS:

The '80s saw a lot of changes in the high tech industry, from technological developments to shifts in user buying habits. In order to deal with the challenges of an ever-different marketplace and the uncertainties of the next decade, the venture capital community is also changing and adjusting, reevaluating the most effective ways of helping fledgling companies and entrepreneurs with good ideas succeed.

This year, in our annual look at venture capital in the microcomputer industry, we've interviewed two young venture capitalists. George Hara, whose investments include the likes of SCO, Borland, and Wollongong, is working to implement his idea of the multinational high-tech startup, particularly in the US/Japan marketplace. Ann Winblad, herself a successful software entrepreneur, is now a partner in a new venture firm which funds software companies exclusively. Both offer unique and informed perspectives on the issues of the present and the challenges of the future for the computer industry. See page 52.

COVER STORY

Venture Capital In A New Decade 52

By Mary Eisenhart
Cover photos: Michael Jay
For our venture capital profile this year, we feature two young Bay Area venture capitalists who specialize in adding value to companies in particular niches.

Ann Winblad is a partner in a brand-new firm, Hummer Winblad, which invests exclusively in software companies. George Hara has been involved in US-Japan high tech for years and works to help US companies set up joint ventures in international marketplaces. Both have unique expertise and perspective, and offer some useful insights about the issues facing the high-tech industry as it moves into a new and very different century.

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Book Excerpt: Managing Data In Your Business SQL Systems: What You Need To Know 31

By James R. Groff and Paul Weinberg
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By Wayne A. Yacco
Troubleshooting software and diagnosing network conflicts.

Reality Check: On The Road With A Mac Portable 46

By Mary Eisenhart
Lightweight it's not. Functional and truly, uncompromisingly Mac-like it is, and for the traveling Mac user it's often the best option.

The Perfect Portable Mac probably doesn't exist yet, but there's a lot of good about this one.

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The Zenith MinisPort 78

By Ed Kahn
Zenith's tiny machine offers some nice features and few tradeoffs.

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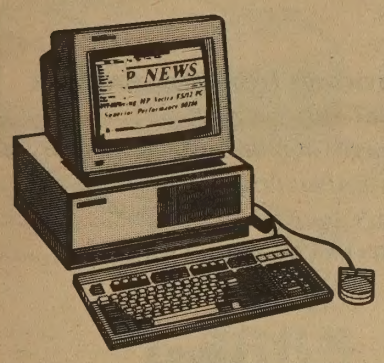

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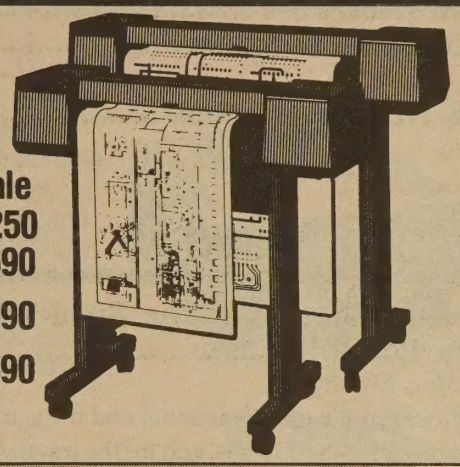

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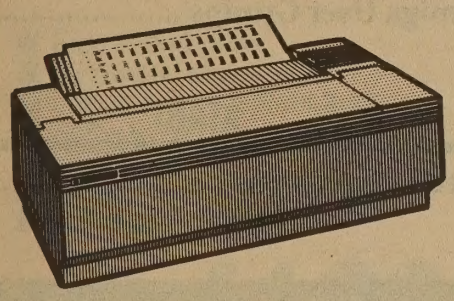

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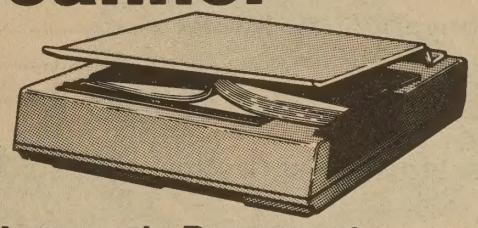

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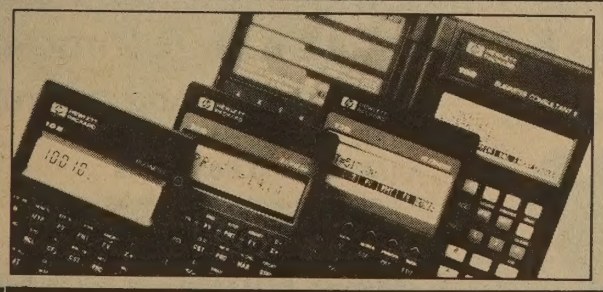

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Zenith MinisPort 78
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Zenith's tiny machine offers some nice features and few tradeoffs.

Compact and lightweight, the MinisPort is a good choice for computing on the go.

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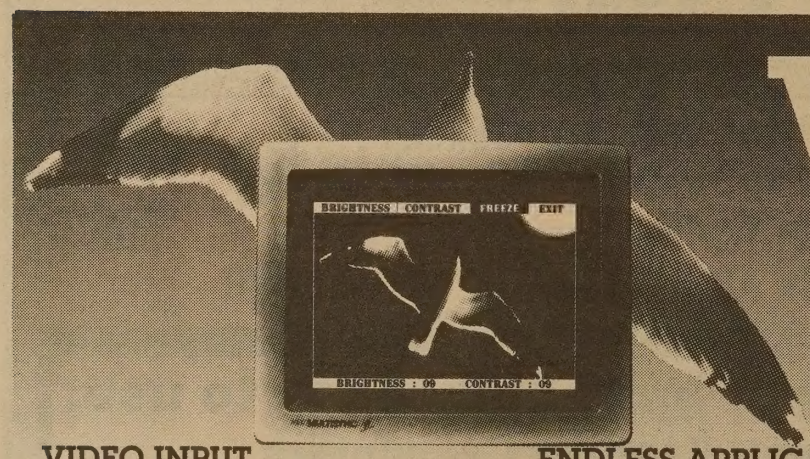

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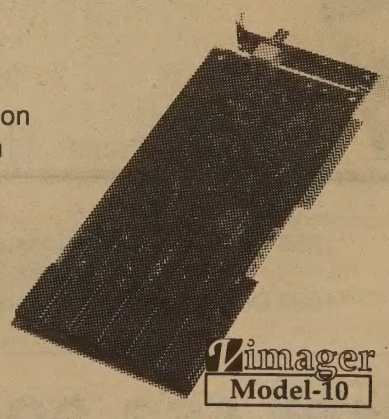

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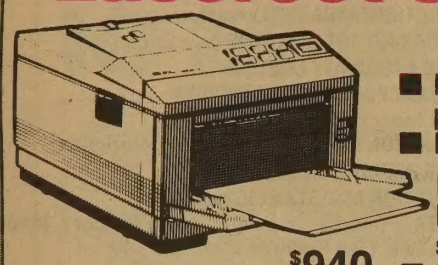

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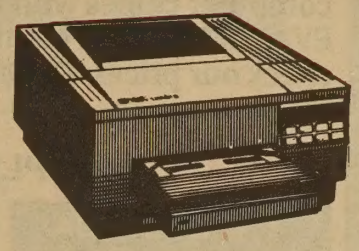

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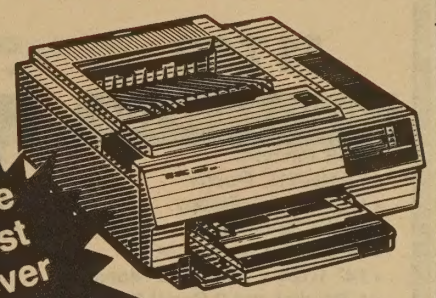

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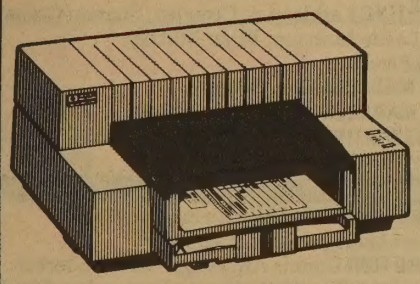

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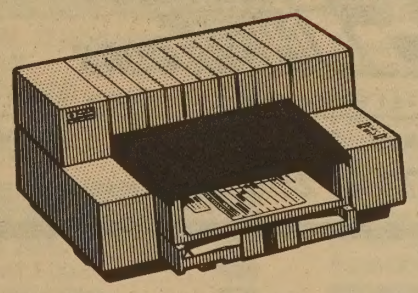

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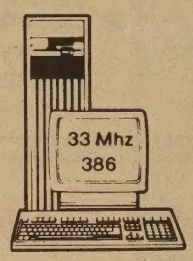

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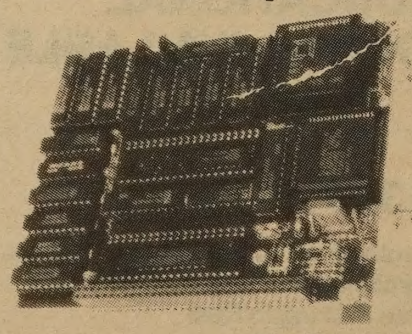

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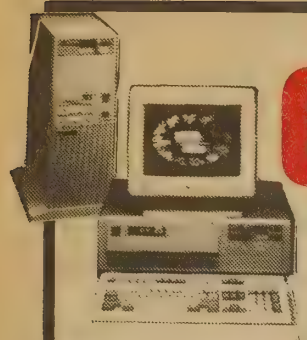

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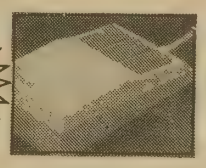

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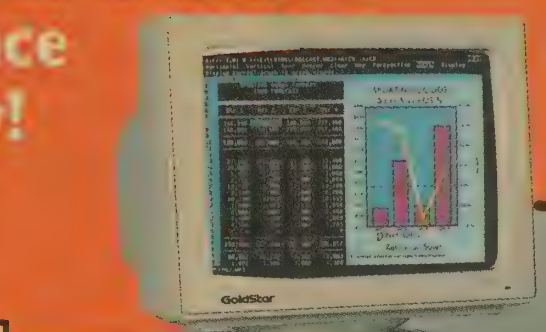

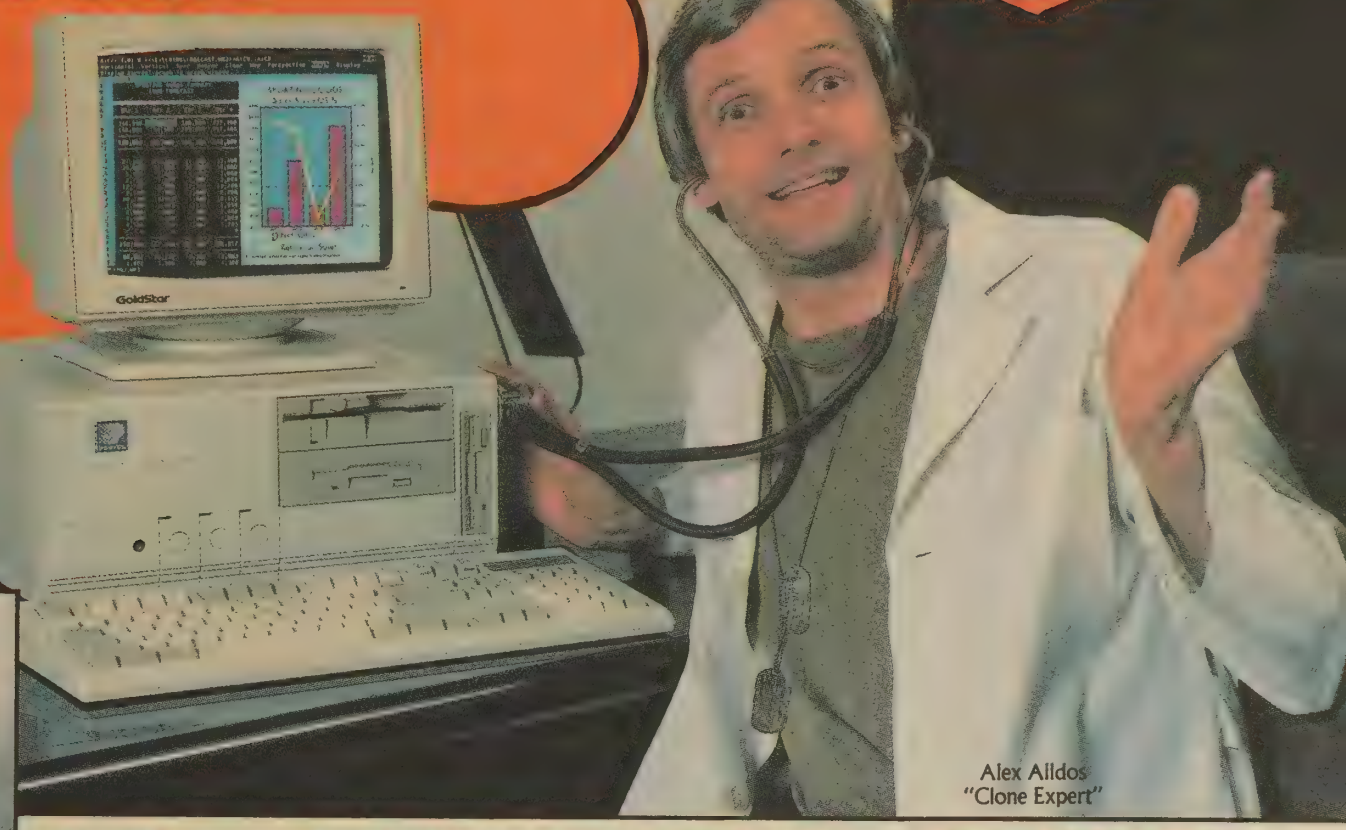

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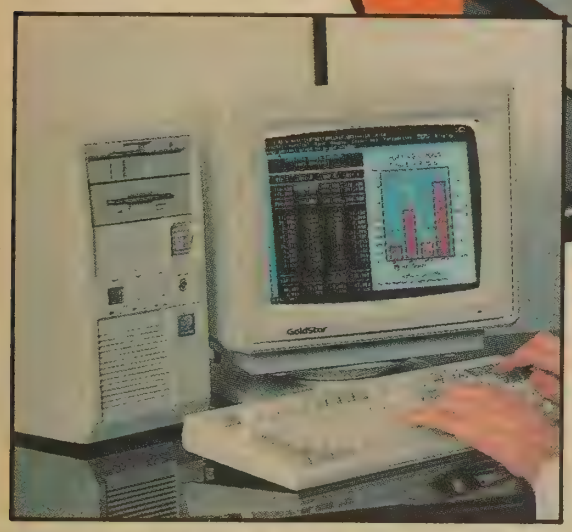

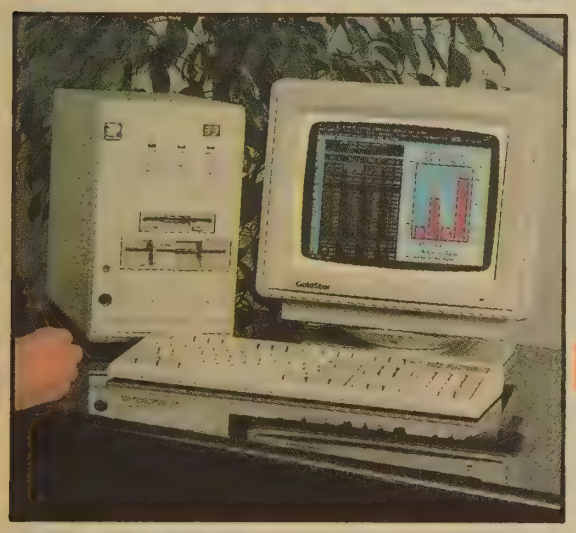

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INDUSTRY INSIGHT

BY PAUL HOFFMAN

LOTUS WINS LOOK-AND-FEEL CASE, SUES BORLAND AND SANTA CRUZ OPERATION

Following a trend of court decisions supporting the concept that a program's interface is copyrightable, US District Judge Robert E. Keeton ruled that Paperback Software's VP-Planner infringed on Lotus 1-2-3's copyright by having the same command sequence and display. The ruling, which will be appealed by Paperback, gave software companies more guidance in what can and cannot be copied when making programs that compete with established software. Lotus hailed the ruling as "a significant milestone," while other software publishers worried that it opened them up to a spate of costly litigation.

A few days after winning the case, Lotus sued Borland International and the Santa Cruz Operation (SCO) for copyright infringement, citing Judge Keeton's ruling. Although SCO Professional is clearly similar in interface to 1-2-3, Borland's Quattro Pro is only similar in one mode, and even then does not need to be if the user does not want it to be. By suing Borland, Lotus seems to be saying that any program that comes with an interface that can be considered infringing automatically infringes, even if the user has many choices for other interfaces.

The judge's ruling simply decided that Lotus did indeed own the copyright on the structure, sequence, and organization of the menus.

Lotus has also asked that VP-Planner be removed from the market and that Paperback be forced to pay millions of dollars. Those parts of the case will be decided later.

Judge Keeton appeared to understand a great deal about computer technology. Many of the introductory pages of his 110-page ruling defined computer jargon as he intended to use it in his ruling and showed that he agreed with most standard usages. He went on to show that he was following a fair amount of precedent in deciding that more than the instructions that make up a program could be copyrighted. For example, the Copyright Office announced that computer screens could be copyrighted and, in fact, were copyrighted at the time that the copyright application for the program was filed.

Much of the decision follows previous federal cases in which judges ruled that the user interface is as worthy of copyright protection as the software itself. Keeton stated that he believed testimony from expert witnesses that "the bulk of the creative work is in the conceptualization of a computer program, in its user interface rather than in its encoding, and that creating a suitable user interface is a more difficult intellectual task, requiring greater creativity, originality, and insight, than converting the user interface design into the instructions of the machine." Since Congress uses the copyright laws to foster people receiving benefit from their creative work, Judge Keeton felt that they would have wanted this type of creativity rewarded by copyright protection.

The response to the ruling varied widely. Although it was pretty much the same as similar cases in the last few years, many people said it would cause many more lawsuits and thus hurt the computer industry. That was borne out the week after the ruling when Lotus sued one of its major rivals in the spreadsheet market, Borland, based on the results of the case. Some lawyers thought that this was premature, since Judge Keeton had the option of levying minor or no damages for the infringement. The case against Borland is also tricky, since the 1-2-3-like interface that comes with Quattro is one of three that the

By suing Borland, Lotus seems to be saying that any program that comes with an interface that can be considered infringing automatically infringes, even if the user has many choices for other interfaces.

Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on USENET (phoffman @well) and MCI Mail (264-3171). He also writes popular microcomputer books.

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user can choose from. It is not the "suggested" interface or even the most desirable one. By suing Borland, Lotus is saying that any program that can emulate a copyrighted user interface is by nature infringing.

Interestingly, Judge Keeton both acknowledged the long public debate on the subject and, at the same time, rejected it. "Despite its widespread use in public discourse on the copyrightability of nonliteral elements of computer programs, I have not found the 'look and feel' concept, standing alone, to be significantly helpful in distinguishing between nonliteral elements of a computer program that are copyrightable and those that are not." He said that look and feel was more useful for comparing two works than for determining whether one deserves a copyright.

"Despite its widespread use in public discourse on the copyrightability of nonliteral elements of computer programs, I have not found the 'look and feel' concept, standing alone, to be significantly helpful in distinguishing between nonliteral elements of a computer program that are copyrightable and those that are not.
—Judge Keeton

Where many people disagree with Judge Keeton is in his ruling that Lotus's use of some of the user interface mechanics means that Lotus should receive a copyright. Keeton said, "The idea for a two-line moving cursor menu is also functional and obvious, and, indeed, is used in a wide variety of computer programs including spreadsheet programs. Nevertheless, it does not follow that every possible method of designing a menu system that in-

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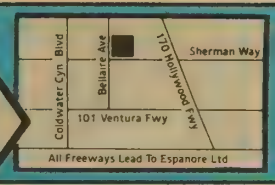

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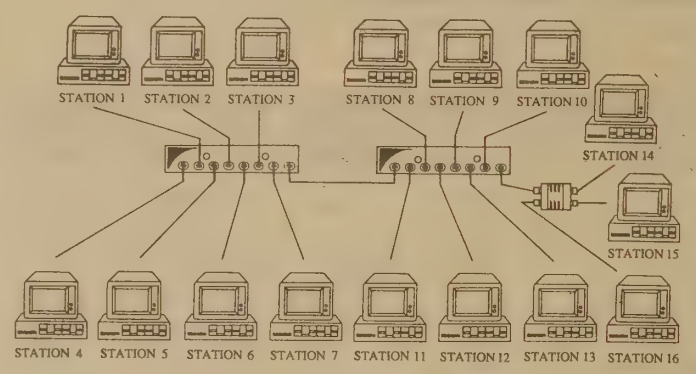

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cludes a two-line moving cursor is non-copyrightable." People criticizing Keeton said that if the structure of the menu is functional and obvious, both of those features should make the menu non-copyrightable.

Instead, Judge Keeton said, "I conclude that a menu command structure is capable of being expressed in many if not an unlimited number of ways, and that the command structure of 1-2-3 is an original and nonobvious way of expressing a command structure. Accordingly, the menu structure, taken as a whole—including the choice of command terms, the structure and order of those terms, their presentation on the screen, and the long prompts—is an aspect of 1-2-3 that is not present in every expression of an electronic spreadsheet." To many, this seems to contradict what he said earlier.

Of course, once the decision that 1-2-3's user interface can be copyrighted is made, there is no doubt that VP-Planner infringed on the copyright. The defendants at Paperback Software admitted to copying the interface in order to make it easier for their users to learn the software. There were some differences, but Judge Keeton felt that, "From the perspective of both an expert and an ordinary viewer, the similarities overwhelm differences." He continued, "Moreover, even if some elements of VP-Planner were very different, it would not give defendants a license to copy other substantial elements of 1-2-3 verbatim."

The last part of his ruling specifically criticized the concept that he should rule against Lotus for the benefit of the greater software development community. "Policy arguments advanced without focusing on whether they are inconsistent with the mandates of legislation—along with strained analogies and word games—are fundamentally flawed because they do not take account of limitations on the role of courts, to which counsel as well as courts are obliged to be sensitive. Courts must enforce the mandates of legislation, and even when answering questions of law not answered by those mandates, must do so in a way that respects legislative policy choices, whether explicit or implicit."

He also claimed that his ruling would not stifle creativity: "The metaphorical 'shoulders of giants' on which successors may legally stand

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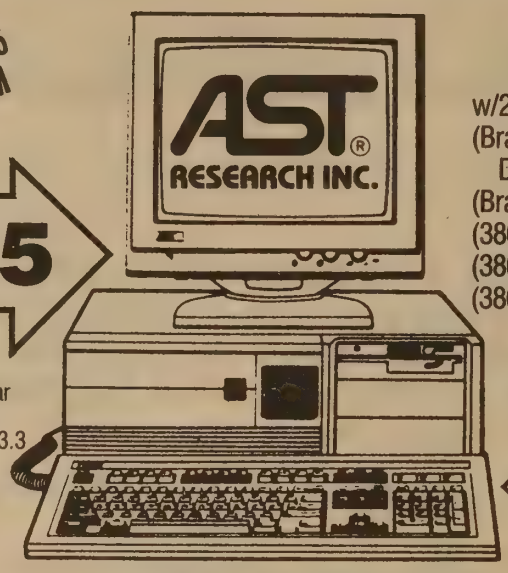

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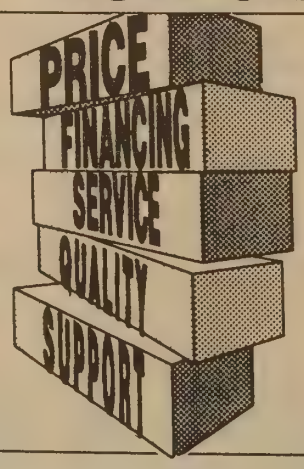

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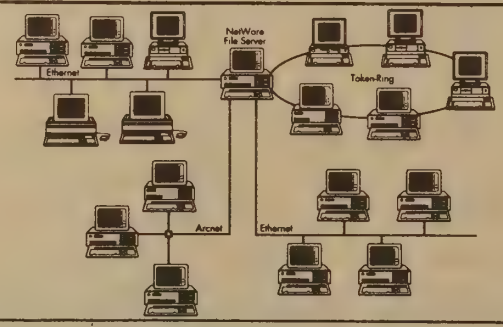

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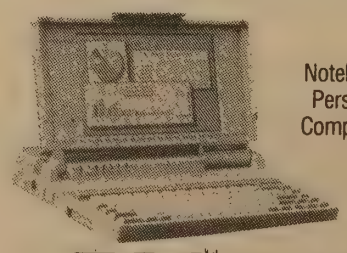

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are not as broad as defendants contend. The legally relevant shoulders of programming giants are their ideas—and do not extend to all of their expressions. The encouragement of innovation requires no more. It is sufficient that programmers are privileged to borrow and improve upon previous ideas—such as the ideas for an electronic spreadsheet and a two-line moving cursor menu. Adequate room for innovation remains even though successors are barred from copying earlier authors' particular expressions such as the particular structure, sequence, and organization of a menu command system."

So the argument continues. It is now clear, from this case and many cases before it, that the courts feel that the user interface (or, at least some part of the user interface) is copyrightable. All decisions have gone to great lengths to state that only the non-obvious parts are copyrightable, but this will probably lead to a war of experts saying what is and is not obvious in a user interface. For example, the steady growth of the Macintosh and Microsoft's concomitant emulation of the Mac interface have made much of the user community think that things like closable windows, pull-down menus, mouse pointers, and so on are obvious. Ten years ago, they were considered just plain silly. These rulings indicate that you can only copyright parts of a user interface once a judge would not find them obvious.

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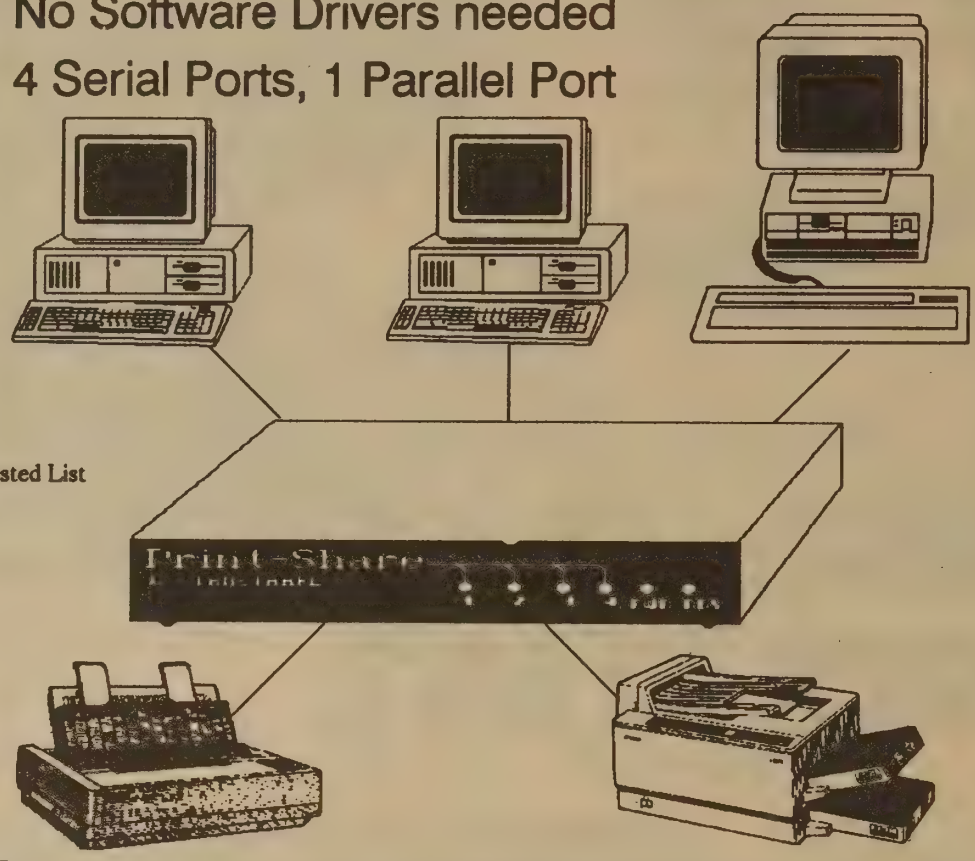

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NEWS & VIEWS

VGA monochrome display, a built-in 2400 baud modem, a mouse, and 512K (not even 640K) of RAM. There are no expansion slots, but cards can be added through plugs on the system. MS-DOS 4.01 comes in ROM. The price for that system is $1000. A color display adds $450 to the price. No, you can't buy someone else's display. IBM put the power supply for both the computer and the display in the display, so you are forced to buy a PS/1 display when you upgrade.

Many industry observers noted that $1000 is way too much for most families to spend on a computer. In addition, a similarly configured clone system with expansion slots can be bought from many *MicroTimes* advertisers for around $725. Competing non-PC systems can be found for around $500.

The PS/1s come with a fair amount of free software, probably enough to keep most home-office users happy (as long as they don't want to play games). Each system comes with Microsoft Works 2 and software for connecting to the Prodigy network.

Since IBM was more than willing to drop support for the PC/jr when it was clear that there wasn't much market for it, many buyers are worried that IBM will do the same for the PS/1.

Since buyers will be able to run other MS-DOS software (well, non-Windows and non-OS/2 software), the systems should not limit the buyers too much. The hard disk systems (with 1Mb of RAM) cost about $600 more than the floppy-only systems.

Given the slow CPU and limited expandability, no one is concerned that IBM is cannibalizing the PS/2 line. Instead, they are concerned that people who know much about PCs will scoff at the PS/1 as underpowered and not able to grow in the future. Since IBM was more than willing to drop support for

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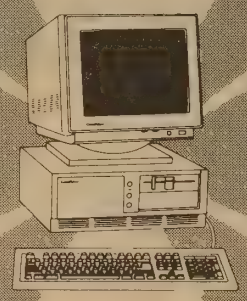

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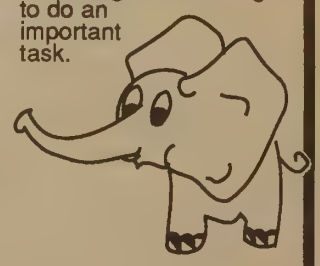

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the PC/jr when it was clear that there wasn't much market for it, many buyers are worried that IBM will do the same for the PS/1.

DOS 5, WINDOWS 3

Microsoft announced that they will ship MS-DOS version 5 by the end of this year. There are not many changes in the new version, but it should help most users, since it uses less of the first

Since its introduction, Windows 3 has been selling briskly. Although the setup procedure for Windows 3 is significantly better than for Windows 2, Microsoft has been inundated with calls, causing significant delays in responding.

640K of memory than current MS-DOS. PCs with extended memory will be able to put much of the system code in higher memory. People who run MS-DOS programs under Windows 3 on 80386 systems will get much more memory under DOS 5. Microsoft indicated that there will be many user interface improvements as well.

Since its introduction, Windows 3 has been selling briskly. Hundreds of thousands of people who are interested in the environment have either upgraded or bought new packages. Although the setup procedure for Windows 3 is significantly better than for Windows 2, Microsoft has been inundated with calls, causing significant delays in responding. They have set up two new telephone lines to handle the increased call loads: (206)637-7098 for Windows 3 and (206)637-7099 for Windows applications. The numbers have non-human call attendants during off hours to answer the most common Windows questions for people with touch-tone phones. ■

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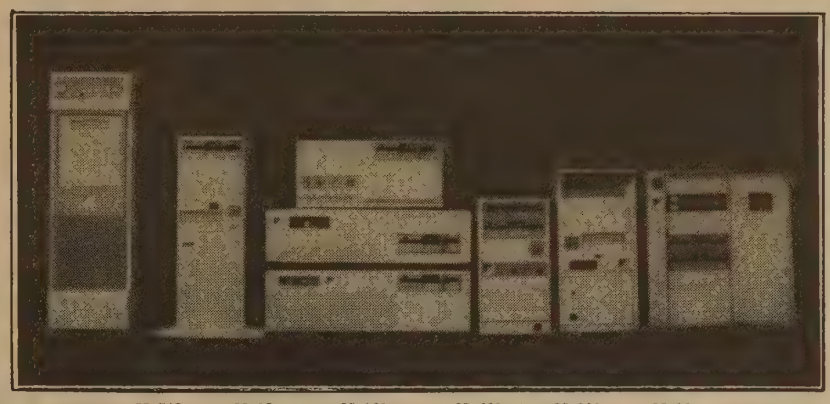

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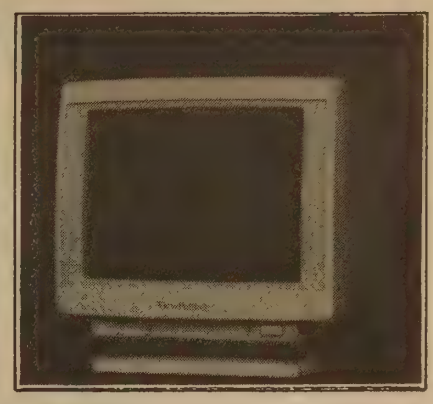

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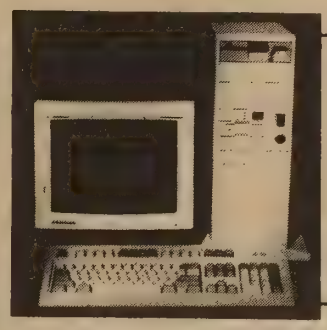

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- * Super Mini Vertical Case (shown)
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- * 1MB Memory on Board
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- * 200 Watts Power Supply
- * Page Interleaving / Shadow RAM

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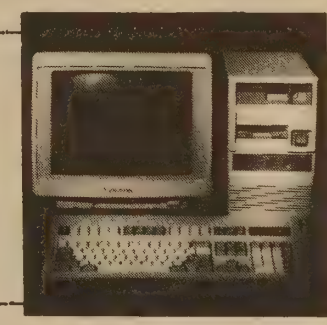

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- * 200 Watts Power Supply

Essence 286-16 AT System $475.00

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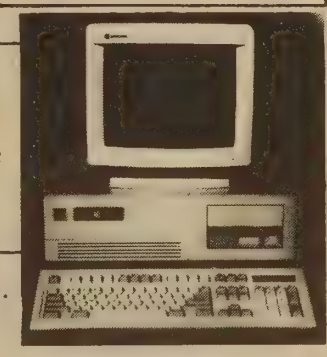

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For XT:

20MB w/Controller (62ms)	+$220.00
30MB w/Controller (62ms)	+$240.00

For 286 & 386:

20MB (62ms)	+$222.00
40MB (28ms)	+$260.00
65MB (25ms)	+$343.00
80MB (25ms)	+$475.00
100MB (25ms)	+$560.00
120MB (18ms)	+$643.00
150MB (18ms)	+$865.00
200MB (25ms)	+$895.00
300MB (18ms)	+$1590.00

Monitor + Video Upgrade:

12" Monochrome Monitor w/MonoGraphics Card	+$98.00
14" Monochrome Monitor w/MonoGraphics Card	+$119.00
14" RGB Color Monitor w/ColorGraphics Card	+$215.00
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14" ViewSonic 2v VGA Color Monitor w/PVGA-1024 (256K)	+$415.00
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Ultimate Archiving—More'n You Ever Thought

BY JIM WARREN

Last issue's column addressed file-*backup*. This fantasizes of exquisite *archiving* systems. Implement this and make millions!

REALIZABLE FANTASIES

ARCHIVING: FOR BACKUP AND RETENTION

Archiving saves current files and their directories, but also retains previous copies of those files and directories. This provides error recovery backup while retaining currently unneeded files for future reference or use.

Adequate archiving systems catalog all files archived in all archiving sessions, and their directories. (Information stored with each archive-file permits reconstructing the catalog and directories from the pure file-archives, if necessary.)

During archiving, notes of arbitrary size, format and content can be included in the catalog info for any file, directory subtree, or as part of the catalog's session info (date, time, sources, targets, original file-size, etc.). The catalog includes an annotated audit trail for all archiving activities. It's stored on a single, user-specified medium—not necessarily on the same media as the archived files. The catalog can be copied, independently of the file-archives.

Copyright © 1990 by Jim Warren. All rights reserved. *Jim Warren founded* InfoWorld, *the DataCast proposal for broadcast-based paperless electronic newspapers, Video Initiative, Wireless Digital, Initiative, Inc. and the nation's largest public microcomputer convention. He was founding host of PBS television's "Computer Chronicles" series, founding editor of* Dr. Dobb's Journal, *founding president of the Microcomputer Industry Trade Association, and has chaired various computer professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics.*

THE FAST, SLOPPY APPROACH

The naive, massively consumptive approach to archiving is to disk-copy everything from the source to an archive medium—duplicating all files that were unchanged since the previous archiving session.

Much less wasteful: Only those parts of the source not already stored in the target archive are saved. Files are not duplicated—except as specified by the user for safety through redundundancy.

WHAT'S A DUPLICATE; WHAT'S NOT?

Complications: (1) Between archiving sessions, the user may change a file's name or directory-path, though the file remains functionally unchanged. (2) Executable files—as opposed to data files—may be functionally identical, but have their program modules stored in different order (e.g., resource forks of Mac applications, but functional equivalence can still be detected). (3) Identical files may have different dates—e.g.,executable files compiled at different times from an unchanged source. (4) File compression and encryption create further complications for identifying functionally identical files.

SOLUTION FOR DUPLICATE PROBLEMS

A robust, 12-to-24 digit hash-code can be used to catch almost all functionally identical files—regardless of changes in filename, directory path, creation date or modification date. If modules can have different sequences (e.g., in Mac resource forks), the hashing algorithm accounts for it. Compression and encryption occurs after hash-coding.

Each file's few-byte hash-code is part of the file's cataloged information. New file-archives are flagged as original archive-copies. When archiving another file, its hash-code is compared to those of already-archived originals (much faster than comparing name/date/size/etc.).

For functional duplicates, their (small) catalog information is stored as usual—name, date, directory path, comments, etc.—flagged as a dup and including a pointer to the original archive-copy. The (larger) file itself is not stored.

The user is responsible for avoiding further unnecessary growth in the size of archive storage. The Rule: *Backup regularly; archive selectively; purge periodically.*

ABOUT BROWSING

There are often thousands of files cataloged for a single microcomputer user's archives. A backup or archiving system's utility depends on its browser(s). A browser is used to search for archived files and/or their directories, using the catalog information. The user marks those files and directory paths of interest. Several actions can be applied to the marked items.

A browser of similar style is used when archiving from active files, to browse those active files while comparing them to previously archived files.

Features fantasized for Beautiful Browsers:

Display: The user may display the catalog as a "flat" list of files-only, or as the files with their hierarchical directory structure, or as only the directory structure. Indentation, fonts and color illustrate directory hierarchy. Archive dates may optionally be used as paths from the

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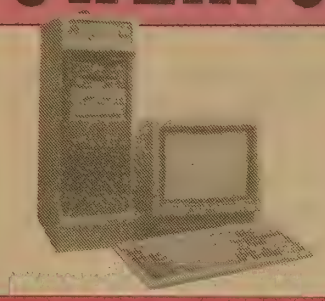

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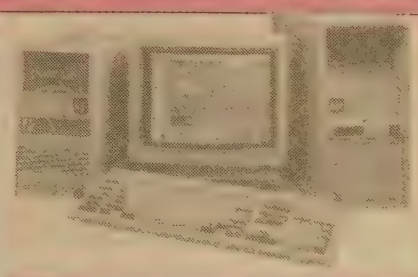

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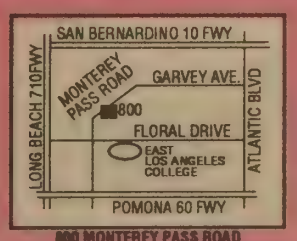

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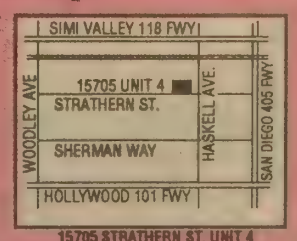

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hierarchy's root.

The user controls format and content of displayed information—including fonts, text-sizes, colors, icons, positions, field formats, etc. (Retrospect for the Mac, from Dantz Development in Berkeley, has the most robust capability for this I've seen, so far!)

Searching: The user can browse—a screen-full at a time—the entire catalog of archived files, or any user-reduced or user-excerpted part of the catalog. Browser catalogs can be sorted on any of all of their fields, including directory-path, filename, dates (created, modified, archived, etc.), file-types (program, text, data, creator, etc.), size, hash-code, original/duplicate, and so on. Files may be sought—and marked or unmarked—by typing full-text, first-text or partial-text of any catalog data field(s) or full or partial directory paths. Wild-cards are permitted—place-holders for any character.

Marking: Files can be marked by point-and-click (of course, all modern computers have a pointing device) or point-and-drag across a sequence. One or many files in any part(s) of the catalog can remain marked at the same time.

Action: Once files and/or directory paths are marked. The browser catalog can be limited to those marked (sometimes called a "draw-off"), or those marked can be removed from the current browser catalog. This limits what the browser sees and displays, but does not change the archive catalog. The marked part can be printed with full user control of format and device.

Catalog entries for marked files—scattered through the catalog—may be viewed in sequence. The user can change most fields in a file's catalog data—dangerous but desirable.

For retrieval: Marked files may be retrieved—by file, by directory node, or by directory subtree. The user controls overwriting duplicates and target directory paths.

For reference: Any marked file(s) may be dumped to the screen or printer with the user controlling pauses and formats—text, hex, bitmap, etc.

For purging: Marked files that are not duplicates may be entirely deleted, reducing the file-archive size and simplifying the catalog. Duplicate-references of marked archives can be flushed.

For added archiving: Marked files and their catalog data may be exported to a new archive on the same or different media.

ARCHIVING ADDENDA

Important: Pascal and C utility routines—and documentation—are available to allow user-programmed access to all catalog information and all archived files.

Alternatives for encryption, compression, error detection, error correction, read-then-write, read-write-compare are all under user control.

Encountering mismounted removable media, or limits in size of memory, source, catalog media or file-archive media causes no disorder.

The user may automate/script archiving with a text editor or "watch me". Scripts are plain language in free format. They may be triggered by time or date. Archiving may run in the background with user-specified relative priority.

Of course all this works on LANs, networks, remote servers and remote systems.

Most future columns will be less monopolized by a single topic. But, designing utopias is *so* much *fun!* ■

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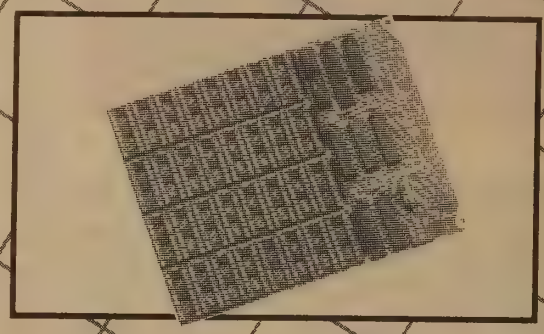

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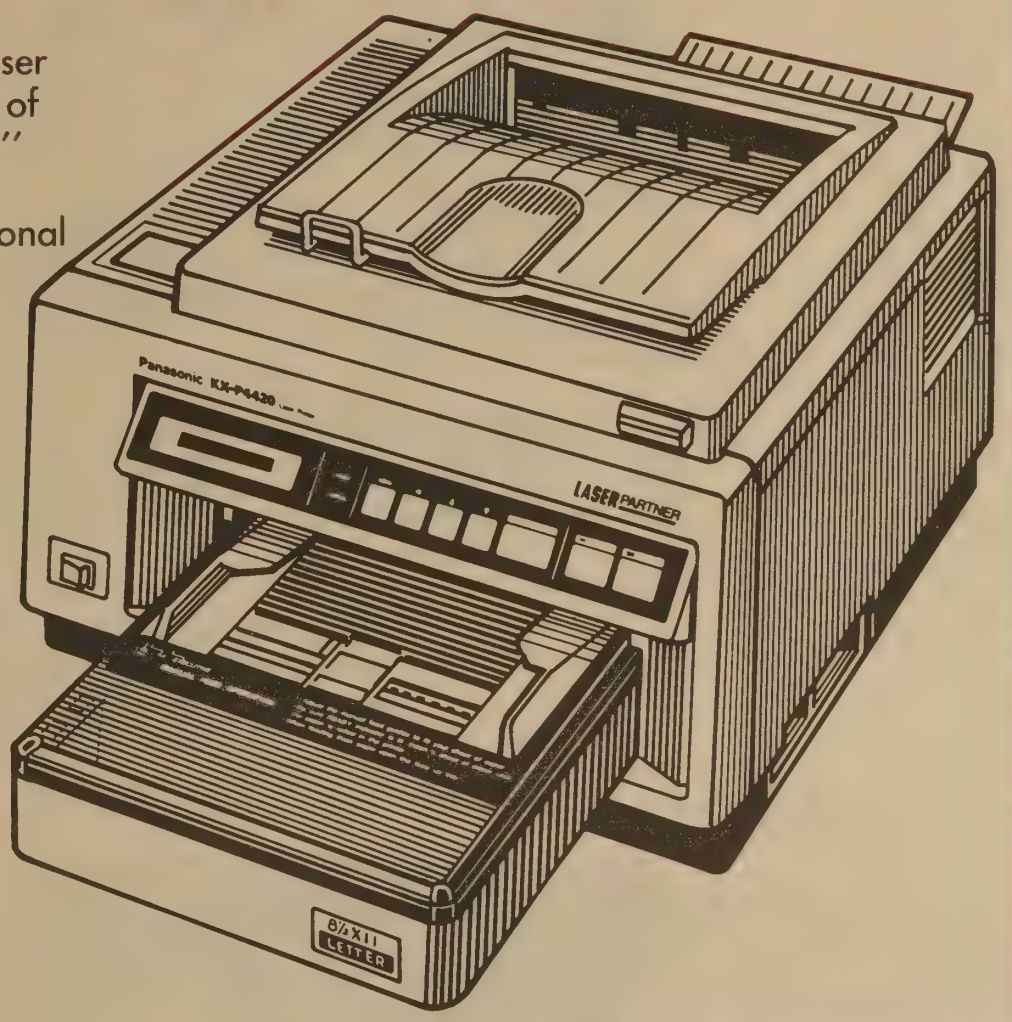

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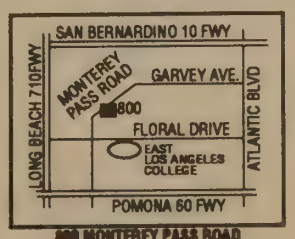

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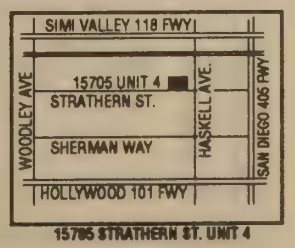

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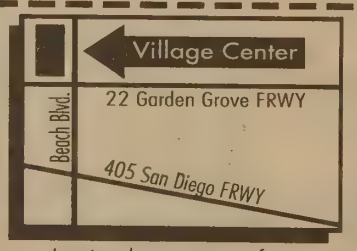

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BUSINESS SOLUTIONS

Managing Data In Your Business

SQL Systems: What You Need To Know

BY JAMES R. GROFF & PAUL WEINBERG

Still considered a somewhat arcane concept, Structured Query Language is emerging as an important standard in powerful relational databases. Whether your business's data processing needs are currently being handled by PCs, networks, minis or mainframes, chances are there's a SQL-based system in your future even if you're not using one now.

Using SQL, by James R. Groff and Paul Weinberg, offers a thorough discussion of the subject from its theoretical underpinnings to its current applications, from programming tips to the strengths and weaknesses of existing products on many platforms. If you work in the database area, the book is an indispensable resource and reference.

SQL is one of the most important technologies driving and shaping the computer market today. From its first commercial implementation a little more than a decade ago, SQL has grown to become the standard database language. With the backing of IBM, the blessing of standards bodies, and the enthusiastic support of DBMS vendors, the evidence clearly shows the importance of SQL:

•IBM's flagship databases, on systems from mainframe processors to personal computers, are all based on SQL.

By James R. Groff and Paul N. Weinberg from Using SQL, *published by Osborne/McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710, 1-800/227-0900.*

DBMS Vendor Profiles

This [article] contains profiles of some of the leading vendors of SQL-based DBMS products. The vendors are leaders in their respective market segments in terms of either technology or market share, and collectively are responsible for 75 percent or more of SQL-related revenues. These vendors and their products are:

•Ashton-Tate (dBASE IV, SQL Server) *See page 32*

•Digital Equipment (Rdb/VMS, VAX SQL) *See page 36*

•Gupta Technologies (SQLBase, SQLWindows) *See page 36*

•Hewlett-Packard (HPSQL) *See page*

•IBM (DB2, SQL/DS, SQL/400, OS/2 Extended Edition) *See page 38*

•Informix Software (Informix-SQL) *See page 84*

•Ingres (Ingres) *See page 86*

•Microsoft (SQL Server) *See page 88*

•Oracle (Oracle) *See page 92*

•Sybase (Sybase SQL Server) *See page 92*

•Tandem (NonStop SQL) *See page 94*

•Unify (Unify, Accell) *See page 96*

•Every major independent DBMS vendor and most computer hardware manufacturers either offer or plan to offer SQL-based products.

•SQL-based databases are beginning to dominate in virtually every market segment, from personal computers to OLTP systems.

•The largest PC database vendor, Ashton-Tate, has bowed to market pressure and grafted SQL onto its dBASE IV product.

This chapter describes the current trends in the database market and the impact that they will have both on SQL and on the computer market of the 1990s.

ASHTON-TATE CORPORATION

Ashton-Tate is the leading vendor of personal computer database products. Its dBASE II and dBASE III products have sold over two million copies, and they have consistently held a 70 percent or greater share of the PC DBMS market during the 1980s. Both dBASE II and dBASE III were basically flat file managers with a limited ability to join data across multiple files. Even though these databases were limited, the dBASE programming language was used to develop a wide range of business applications on PCs, and has become a de facto standard.

By the late 1980s, minicomputer DBMS vendors had ported their products to personal computers and began to exert competitive pressure on the aging dBASE product line. In addition, competitors in the personal computer market offered more advanced products. Ashton-Tate responded with dBASE IV, which was designed to provide backward compatibility with earlier versions of dBASE while providing the more advanced features that users were demanding. In addition, dBASE IV featured SQL support "grafted onto" the dBASE language. Finally, dBASE IV was to provide a front-end for SQL Server, the OS/2 version of the Sybase DBMS.

Unfortunately, the initial release of dBASE IV had some serious bugs, and Ashton-Tate's engineers discovered that all of the objectives for dBASE IV could not be achieved within the 640KB memory limitation of MS-DOS. The product was revised and has been reintroduced in two versions. The stand-alone dBASE IV product runs on a standard IBM PC and supports both dBASE and SQL statements that access a local database. The network dBASE IV product requires an MS-DOS memory extender. It supports the same language statements as the stand-alone version, and it provides access to SQL Server databases across an OS/2 local area network.

Ashton-Tate and Microsoft share marketing responsibility for the SQL Server DBMS in the OS/2 market. Ashton-Tate initially had exclusive retail distribution rights for the product and was responsible for selling it in volume through computer stores along with its other database products. With the very slow initial sales of OS/2, however, the product has been less than spectacularly successful, and Microsoft has sought out other retail distribution channels for the product.

Ashton-Tate's current revenues are in the $400 million range. The company still holds the largest share of the PC DBMS market by virtue of its installed base of dBASE users, but it faces a major challenge to maintain that position in the face of competitive pressures from IBM, other PC DBMS vendors such as Borland, and full-line DBMS vendors such as Oracle Corporation.

DATABASE MARKET TRENDS

As the 1990s began, the size of the market for database management products crossed the three billion dollar mark, and forecasters predicted continued healthy growth throughout the decade. At the same time, the neat divisions that characterized the database market of the 1980s were rapidly fading. DBMS products could no longer be clearly categorized as "PC databases," "minicomputer databases," "OLTP databases," "mainframe databases," and so on, each participating in its own market segment. Instead, standardization on SQL and the relational database model created a new, more unified database market.

These changes in the market have produced dramatic changes in the fortunes and marketing strategies of DBMS vendors. To be successful, a DBMS vendor must provide SQL support and then provide additional value-added on top of SQL. Established DBMS vendors whose products are not based on SQL are scrambling to provide SQL support and hold on to their installed base of systems. The experiences of Ashton-Tate in the PC market and Cullinet in the mainframe market show how this phenomenon has cut across all segments of the database market. Meanwhile, DBMS vendors who already have SQL-based products are taking advantage of the opportunity, attacking both established vendors and each other.

The battle lines are particularly well drawn in two segments of the computer market. In the transaction processing segment, the major hardware vendors (such as IBM, Digital, and Tandem) have all introduced OLTP systems based on relational databases (DB2, Rdb/VMS and NonStop SQL, respectively) competing with independent DBMS vendors (such as Oracle, Ingres, and Sybase) who tout transaction processing versions of their products. In the personal computer segment, the advent of OS/2 has produced a clash between the hardware giant (IBM, with OS/2 Extended Edition), a coalition of personal computer giants (Microsoft, Ashton-Tate, and Lotus with SQL Server), and the largest independent DBMS vendor (Oracle with Oracle Server for OS/2) for dominance of the desktop.

As the experience of these two market segments shows, the rise of SQL has produced a dramatic reorientation of the database market, which is still in progress. Competition based on market segment is giving way to

The rise of SQL has produced a dramatic reorientation of the database market. Competition based on market segment is giving way to competition based on other factors, including performance, portability, and support.

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competition based on other factors, including:

- DBMS features and SQL extensions
- transaction processing performance
- portability across multiple hardware platforms
- DBMS vendor reputation
- distribution channels
- support and service

With the changing competitive landscape, it seems very likely that some of the leading DBMS vendors at the beginning of the decade will no longer be leaders at the end of the decade.

HARDWARE PERFORMANCE TRENDS

One of the most important contributors to the rise of SQL during the 1980s was a dramatic increase in the performance of relational databases. Part of this performance increase was due to advances in database technology and query optimization. However, most of the DBMS performance improvement came from gains in the raw processing power of the underlying computer systems.

For example, with the introduction of DB2 Version 2, IBM claimed performance of 270 transactions per second (tps), up 120 percent from 123 tps for the previous release of DB2. However, a closer examination of the benchmark results showed that the performance of the DB2 software itself improved only 51 percent, from 123 tps to 186 tps. The remaining 69 percent of the performance increase was due to the more powerful mainframe on which the tests of the new DB2 software had been conducted.

The performance improvements in mainframe systems were paralleled in the minicomputer market, where the VAX 11/780 was replaced by VAXes with ten or twenty times its power, and in the personal computer market, where the Intel 8086 gave way to the 80286, 80386, and 80486. These hardware advances overcame the higher overhead of the relational data model and gave it performance comparable to the nonrelational databases of a decade ago.

The improvements in computer hardware price/performance should continue unabated through the 1990s, providing continuing performance improvements for relational DBMS products. Some of the most dramatic

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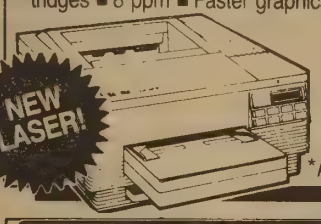

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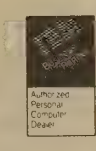

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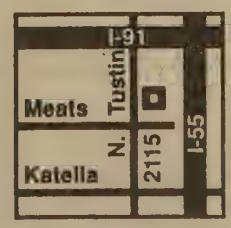

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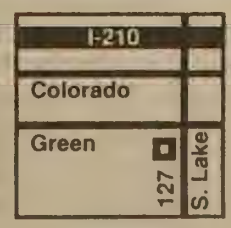

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advances are coming from multiprocessor systems, where two, four, eight, or more processors operate in parallel, sharing the processing workload.

A multiprocessor architecture is especially appropriate for OLTP applications, where the workload consists of many small, parallel database transactions. Traditional OLTP vendors, such as Tandem, have always used a multiprocessor architecture, but multiprocessor systems are now becoming part of the data processing mainstream. The largest mainframe systems already use a multiprocessor design, and multiprocessor systems are becoming an important part of the VAX minicomputer product line. These developments will drive down the cost of multiprocessor systems, further improving the price/performance of relational database systems.

DIGITAL EQUIPMENT CORPORATION

Digital Equipment Corporation, the largest minicomputer vendor in the world, is also a major player in the minicomputer database market. Digital's VAX family of systems ranges in price and performance from personal VAX workstations costing under $10,000 to the VAX 9000 series, a mainframe-class system costing several million dollars.

The product line supports two different operating systems. VAX/VMS, the company's flagship operating system, is proprietary to Digital. Ultrix is an alternative UNIX-based operating system that is popular in engineering and scientific environments. In addition to its VAX architecture products, Digital markets a family of RISC workstations and a line of IBM-compatible personal computers.

Digital's flagship relational DBMS is Rdb/VMS, which runs solely under the VAX/VMS operating system. Internally the Rdb/VMS database engine supports the Digital Standard Relational Interface (DSRI), a low-level binary interface. Above the DSRI level, Rdb provides two language-based interfaces—VAX SQL, which supports embedded SQL and interactive SQL access, and RDO, which supports a proprietary Digital database language. The RDO language is slowly being phased out in favor of VAX SQL.

The Rdb/VMS DBMS itself provides only a basic set of database tools for system administration. To boost its offering, Digital licensed the Ingres tools from Ingres Corporation and modified them to support Rdb/VMS. Digital has also licensed the Ingres DBMS itself and offers it as the Digital-supported RDBMS under the Ultrix operating system.

In 1989 Digital bundled the Rdb/VMS run-time system with the VAX/VMS operating system, making it a fundamental part of the VMS operating software. Digital also indicated its intention to build other layered VMS products on top of the Rdb/VMS foundation. Remote access to Rdb/VMS data is provided by VAX SQL Services, a SQL-based API that uses DECnet networking protocols. SQL Services access is available from VMS and Ultrix-based workstations, from MS-DOS based personal computers, and from Macintosh systems. An Rdb/VMS add-on product, called VIDA, provides access to mainframe data stored in IDMS/SQL or DB2 databases.

GUPTA TECHNOLOGIES, INC.

Gupta Technologies is one of the smaller relational DBMS vendors, but has an impressive list of technical "firsts" to its credit. The company was founded by a former manager of Oracle Corporation's microcomputer division. The Gupta product line includes a relational DBMS and database development tools, all aimed at PCs and PC local area networks.

SQLBase, the company's SQL-based DBMS engine, runs on MS-DOS or OS/2 based personal computers. SQLBase runs either on a stand-alone PC or on a local area network of PCs. In the latter configuration, the SQLBase server was the first and only major SQL-based server to run on an MS-DOS based PC. The server supports client PCs running on a NETBIOS-based local area network. SQLBase also provides a gateway to DB2, linking Gupta's PC products to mainframe data.

Other unique features of SQLBase include support for long data types ("blobs"), updatable scroll cursors, programmatic control over cursor isolation levels, and result sets, which allow the results of one query to be used as the data source for subsequent queries. The programmatic interface to SQLBase is through a callable API.

In addition to its database engine, Gupta offers SQLWindows, a collection of development tools that provide a graphical user interface for database processing. SQLWindows runs under Microsoft Windows and supports the development of "point-and-click" style database applications. SQLWindows works with Gupta's own SQLBase DBMS and also with other SQL-based back-ends, including OS/2 Extended Edition, SQL Server and Oracle Server. A version of SQLWindows that runs under OS/2 Presentation Manager is planned, and it will provide a similar graphical interface from OS/2 based PCs to a range of back-end database engines.

Multiprocessor architectures pose a special dilemma for DBMS vendors who bypass the operating system in an attempt to improve database performance. The Sybase DBMS, for example, operates as a single process and takes responsibility for its own task management, event handling, and input/output—functions which are usually handled by an operating system such as UNIX or VMS. While this improves performance on a single-processor system, it prevents the operating system from automatically spreading the Sybase workload across multiple processors. To reap the advantages of a multiprocessor system, the Sybase DBMS software must be rewritten, duplicating the logic that is already in the operating system.

By contrast, DBMS products that do not bypass the operating sytem can automatically benefit from the multiprocessor environment. Oracle and Ingres both use this argument to defend their own architectures, and they point to benchmark results on multiprocessor systems as the proof of their claim.

Several companies are combining high-performance microprocessors, fast disk drives, and multiprocessor architectures to build dedicated systems that are optimized as database servers. These vendors argue

Unfortunately, most of the benchmarks and the resulting data are designed to support vendor marketing claims rather than to enlighten users about DBMS performance in real applications.

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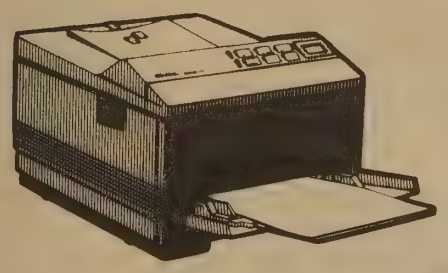

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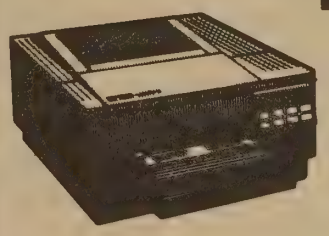

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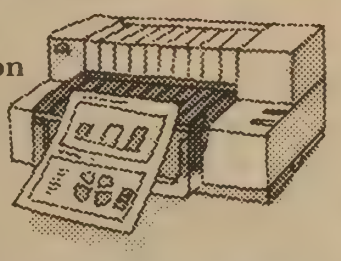

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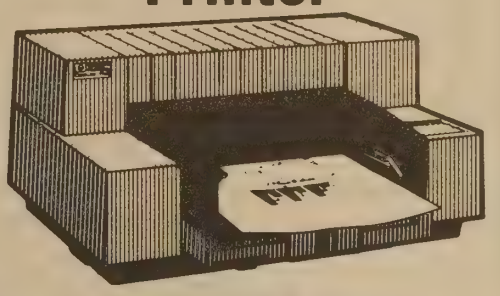

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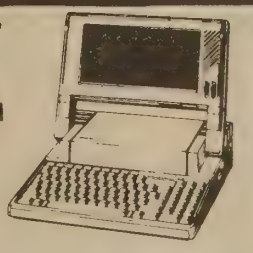

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that they can deliver much better database performance with a specially designed database engine than with a general-purpose computer system. In some cases, their systems include application-specific integrated circuits (ASICS) that implement some of the DBMS logic in hardware for maximum speed.

Dedicated database systems from companies such as Teradata and Sharebase (formerly Britton-Lee) have found some acceptance in applications that involve complex queries against very large databases. However, they have not become an important part of the mainstream database market. History shows that other application-specific systems (such as word processors) have had a very difficult time keeping up with the pace of technical advancement and the economies of scale in the general-purpose computer market. Dedicated database systems will have to overcome these formidable obstacles if they are to play more than a niche role.

THE BENCHMARK WARS

Relational databases and SQL have become part of the data processing mainstream, and they are being used to implement serious data processing applications. As a result, users are paying more attention to the performance of SQL products to ensure that their chosen DBMS won't "run out of gas" as their applications expand. This user concern, coupled with the DBMS vendors' interest in the lucrative transaction processing market, has produced "benchmark wars" among DBMS vendors. Virtually all of the DBMS vendors have joined the fray, each touting benchmarks that show the superior performance of its products while trying to discredit the benchmarks of the other vendors.

Unfortunately, most of the benchmarks and the resulting data are designed to support vendor marketing claims rather that to enlighten users about DBMS performance in real applications. Most of the benchmarks are vendor-proprietary, but two vendor-independent benchmarks have emerged. The Debit/Credit benchmark simulates simple accounting transactions. The TP1 benchmark, first defined by Tandem in 1985, measures a mix of typical OLTP transactions.

In a series of 1989 benchmark results, a multiprocessor Tandem minicomputer specialized for OLTP applications performed at 40 to 50 tps on a TP1 benchmark. Oracle's TP1 performance on midrange VAX systems ranged from 30 to 40 tps. Sybase performance on midrange VAX systems was also in

continued on page 84

IBM CORPORATION

IBM is the largest database vendor in the world, with database-related revenues exceeding one billion dollars. The majority of IBM's database revenues still come from two older, nonrelational, mainframe database products—IMS, a hierarchical DBMS, and DL/1 (Data Language/1), a hierarchical database access method. However, the fastest growing part of IBM's database business is in SQL-based relational databases, and SQL is the standard database interface under IBM's SAA strategy.

IBM has a SQL-based product offering for each of its four major systems families:

•DB2 is IBM's flagship relational DBMS product. It is a large, complex software product that runs on IBM mainframe systems under the MVS operating system. In its more recent releases, the performance of DB2 has improved dramatically, and IBM now markets it as an OLTP solution. However, DB2 is a substantial drain on mainframe resources and requires a sizable mainframe system to support it.

•SQL/DS is IBM's database management system for information center applications. It runs under the VM/CMS operating system on IBM mainframes. A fairly direct descendant of IBM's System/R relational database prototype, SQL/DS has pioneered some innovative relational database features, including extended dynamic SQL. However, from an IBM marketing perspective, it stands in the shadow of DB2.

•SQL/400 is IBM's SQL implementation for the AS/400 series of systems. The successor to the IBM System/38, the AS/400 has a built-in relational database system with hardware support as part of its operating system. SQL/400 runs as an additional layer, providing SQL support to the underlying DBMS software. To date, most AS/400's have been sold as upgrades to IBM System/38 and System/36 systems, and the SQL interface has not been critical to these customers. As the AS/400 begins to play its own independent role as a mid-range alternative to VAXes and other minicomputers, SQL support will become more critical.

•OS/2 Extended Edition is IBM's extended version of the OS/2 operating system for personal computers. It includes an IBM-written relational database with a SQL interface. When it was initially introduced, the OS/2 EE ran only as a stand-alone workstation product. It was enhanced to support a database server configuration in 1989, with DOS-based or OS/2-based PCs acting as clients of an OS/2-based database server.

The SAA architecture includes a specification of an IBM standard SQL, and IBM has stated that it will evolve its SQL products toward that standard to provide applications portability. In the current implementations, however, some significant differences between the products remain.

IBM has also announced its intention to provide distributed database access across its SQL-based products and has revealed a four-step blueprint for providing that access. Detailed timetables for distributed access within each product and between products have not been announced.

The major competitive advantage of the IBM products is, of course, the fact that they come from IBM. Each of the products is a solid, basic SQL implementation, and each product is being steadily enhanced over time. In a few cases (such as referential integrity support), IBM has set the pace for SQL innovation, but generally IBM has been the steady standard setter, leaving the independent DBMS vendors to innovate in new areas of DBMS technology.

HEWLETT-PACKARD CORPORATION

Hewlett-Packard is a major vendor of minicomputer systems, and database management has always played an important role in HP's product line. In the 1970s the company pioneered database management on minicomputers with its Image/1000 DBMS, which ran on HP 1000 minicomputers in engineering and technical applications, and its Image/3000 DBMS, which ran on HP 3000 minicomputers in commercial applications. The Image DBMS was based on the network data model.

In the mid-1980s, HP converted its entire minicomputer product line to a 32-bit RISC architecture and offered two new operating systems for the new product line. The first, MPE/XL, provided backward compatibility with the HP 3000 series. The second, HP/UX, was an HP implementation of UNIX and represented HP's commitment to the UNIX bandwagon.

With the help of technology purchased from an outside DBMS software vendor, HP has implemented a new DBMS, called Allbase, under both MPE/XL and HP/UX. HP offers two alternative interfaces to the Allbase database engine. An Image interface provides backward compatibility for existing applications and presents a network data model view of Allbase data. HPSQL provides a relational interface for new applications and offers an embedded SQL and interactive SQL interface to Allbase data. This dual approach to database access is unique, and it represents a significant technical achievement.

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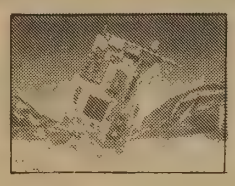
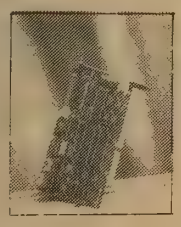
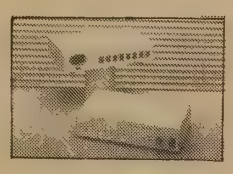


- 8 Bit
- Coaxial + Twisted Pair



- 16 Bit
- Coaxial
- Star/bus



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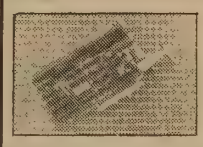

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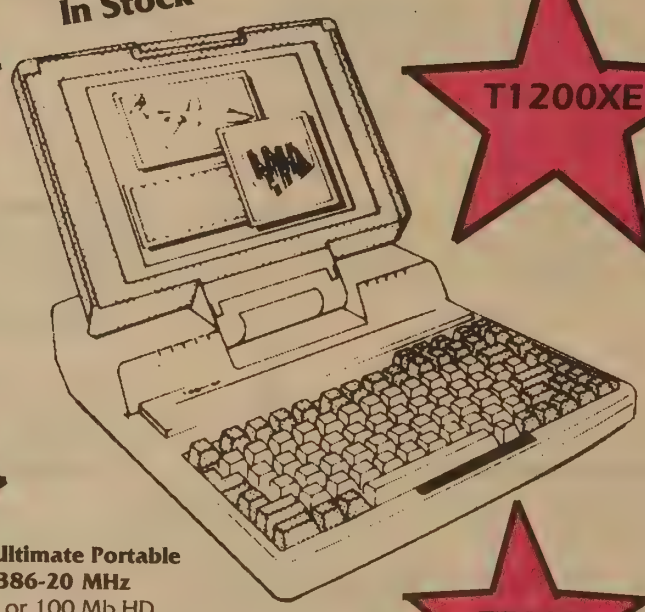

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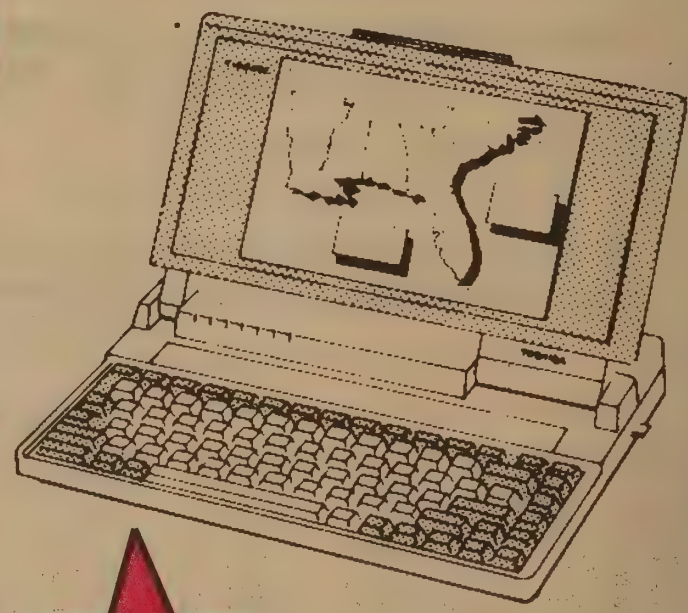

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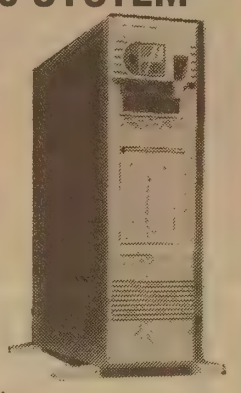

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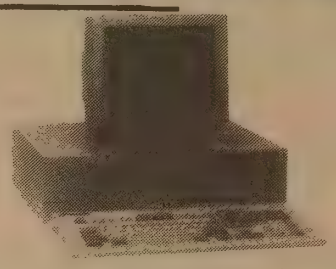

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Diagnostic Software For A Trouble-Free Installation

BY WAYNE A. YACCO

This is the second in a series of columns dealing with tools for LAN configuration. Last month I dealt with physical layout and connection of network hardware. This time I'll look at some of the diagnostic software that can help prepare PC hardware (IBM and compatible) for network-software installation.

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Copyright ' 1990 by Wayne A. Yacco. All rights reserved. *An editor, writer, and consultant specializing in microcomputers and their business applications, Wayne Yacco writes articles, columns, and reviews for many trade and business publications. He can be reached at Box 269, Burbank, CA 91503.*

THREE USEFUL PACKAGES

Ashton-Tate's Control Room, Diagsoft's QAPlus, and Dariana's System Sleuth all allow you to examine available hardware resources. They can be used to determine exactly what features—memory, ports, drive types, and other peripherals—are installed in a system.

A system's existing resource assignments may conflict with network hardware, firmware, and software. Therefore an even more important feature of diagnostic programs is their ability to determine which resources are already in use, and by what other processes. Knowing which processes are causing a conflict allows you to try reassigning resources such as interrupts (IRQs) and direct-memory access (DMA) channels that are required by network hardware drivers or the network operating system.

Control Room provides an excellent report of a system's hardware and can list the programs using EMS and XMS memory. In addition to hardware configuration, QAPlus and System Sleuth report interrupt assignments, and internal and installed device drivers.

Both Control Room and QAPlus have features beyond reporting. Control Room can alter an array of system features, such as keyboard and fixed-disk, to improve their performance. It also includes a number of utilities. One that's particularly slick, creates a boot disk that will reload system settings in an AT's CMOS storage after its battery is replaced. QAPlus is well known for its suite of sophisticated hardware tests. It is used by everyone from end-users, for locating defective components, to manufacturers, for quality-assurance testing.

Sleuth reports more intimate detail of the system's hardware and software, including TSRs and a map of interrupt vectors (which can help to resolve software conflicts). It alone discloses an I/O-port map. Once conflicts are detected, I/O ports can usually be changed either through software settings or by configuring DIP switches or jumpers on adapter boards. These ports are register addresses, and hardware vendors frequently provide means for selecting among several choices. The PC can address 65,536 of them.

Other resources are relatively scarce in the PC. A small amount of I/O memory, and a very limited number of interrupt assignment and DMA channels, can be configured to avoid conflicts. In other cases it may be necessary to choose between devices such as a caching disk controller and a fax board.

THE NUTS AND BOLTS OF CONFLICT AVOIDANCE

System Sleuth reports the contents of I/O (input/output) memory space where ROM-based BIOS (basic input/output system), shadow RAM, and EMS pages are often mapped. Usually conflicts can be avoided simply by following recommendations of the network vendor to remove drivers and terminate-and-stay-resident software from a system.

Some processes, however, cannot be conveniently removed. BIOS software for controllers and disk-partitioning software are among the processes which may need to coexist in these areas along with the firmware for a network adapter. Unfortunately not all products fully document their use of resources and, even when they do, documentation is not always readily available.

I/O addresses are located in the 384K located between the upper limit of the PC's real memory (640K) and the beginning of extended memory (1,000K or 1Mb). The addresses may be mapped onto a variety of memory types by hardware vendors. They may point to shadow RAM on some ATs, or they may point to video memory on an adapter or to ROM on a controller of nearly any type. So, part or all of the address space required by a network may be occupied by other I/O software.

A system's existing resource assignments may conflict with network hardware, firmware, and software. Diagnostic programs can determine which resources are already in use, and by what other processes.

There are many possible causes of conflicts. EGA BIOS and extended video memory (used to provide additional colors or resolution) may reside in blocks beginning at hexadecimal addresses A0000 and A8000. The length of these blocks is nominally 7FFF (32K) so they end at A7FFF. However, applications do not always occupy the entire area. Conventional video memory begins next at B0000 and extends to B7FFF. EGA or VGA BIOS may also reside from C0000 to C7FFF. C8000 to CFFFF is the area of an XT's fixed-disk-controller BIOS; on an AT it may hold VGA BIOS. VGA BIOS, for 16-bit controllers, may also occupy the areas from C8000 to CFFFF and from D0000 to D7FFF. The area from E0000 to E7FFF is where ROM BIOS is shadowed on some ATs. F0000 to FFFFF is reserved for BIOS. EMS software and other controllers can also require space in these areas.

Note that you may encounter references to these addresses without the least-significant nibble (four bits). That is, A000 will refer to A0000. This follows the convention of 8086-family segment registers which, in order to

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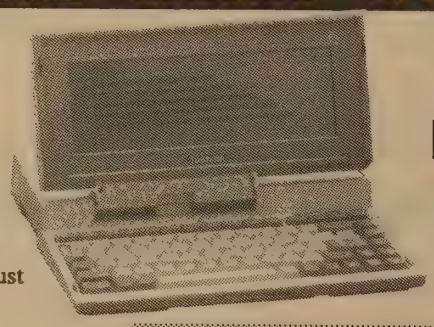

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address the PC's full megabyte address space with 16 bits, are forced to drop the least-significant hex digit. For this reason, segments always begin on a boundary which is evenly divisible by 16 (hex 10), and memory pages are 16 bytes long. Sixteen-bit registers simply can't address segments more precisely. So, A000 may refer to the segment boundary which corresponds to absolute address A0000.

The following are the most common IRQ assignments (interrupt requests or, simply, interrupts). Serial I/O usually uses IRQs 4 and 3 for COM1 and COM2 respectively. The floppy controller uses IRQ 6. An XT's fixed-disk controller uses IRQ 5. A system's first printer port (PRN or LPT1) typically uses IRQ 7 (LPT2 may use IRQ 5). IRQ 2 and 5 are usually available. ATs have an additional set of interrupts available from 8 to 15. Only IRQs 10 and 15 (hex A and F) are usually candidates. IRQs 11 and 12 are reserved for options which have not yet been implemented. They may be available. Other IRQs are reserved for system resources: 0, timer; 1, keyboard; 8, real-time clock; 9, revectored IRQ 2; 13, math coprocessor; 14, hard disk.

DMA channels are not assigned to resources but, with one exception, allocated on request. That exception is channel 0, which is dedicated to refreshing DRAM. At least some of the other three channels will probably be in use by disk controllers. Channel 2 is typically used by the floppy controller. The XT will also use one channel for its fixed disk. An AT has an additional four channels, but because of the way they are implemented, only three more are available. (Channel 4 is used to link—or "cascade"—the two DMA controllers together.)

However, the AT does not use DMA for its fixed disk. Your hardware's installation guide will usually recommend one or two alternatives.

I'll be continuing this discussion of configuration and installation in coming columns with a look at two or three additional types of software: programs that analyze network traffic, those that let you work with remote workstations from a local keyboard, and network utilities. These applications can be used to fine-tune a network and to more easily solve remote problems after workstations are installed. ■

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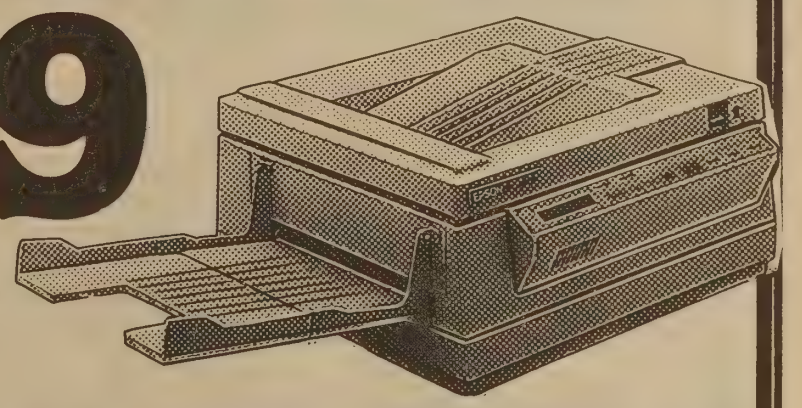

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Reality Check

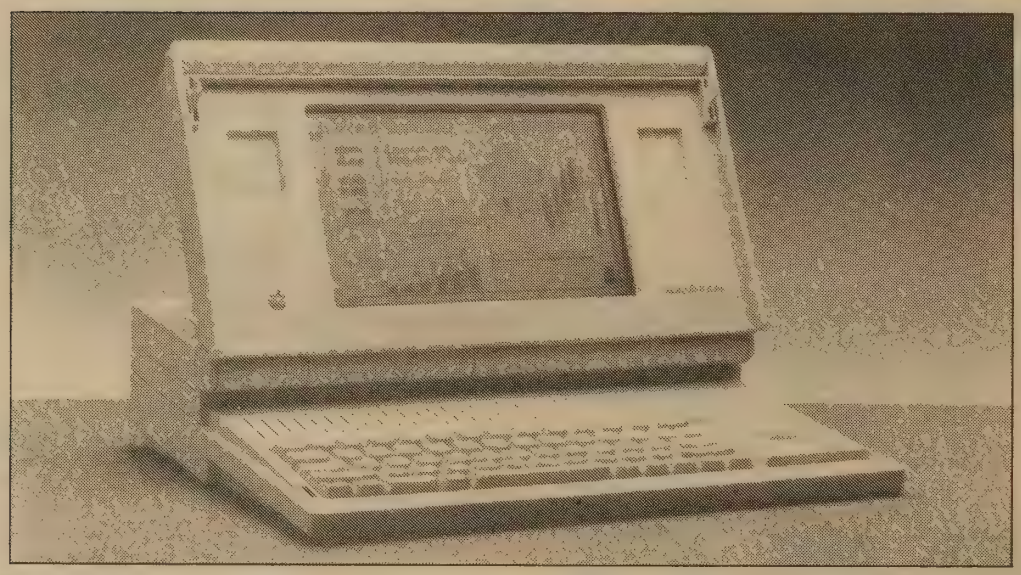
On The Road With A Mac Portable

BY MARY EISENHART

For the committed Mac user, the search for a computer to take on the road is never-ending.

True, if you're willing to sacrifice things like the interface that makes a Mac a Mac and the ability to run your Macintosh applications, you've got a lot of options, from handheld machines to sophisticated DOS-based portables. However, a significant number of us find such "solutions" unacceptable, usually for ease-of-use or application-dependent issues. If you have to show your client that FreeHand document or 4D report and make changes onscreen, or run MicroPhone scripts to download remote information, you need a Mac and that's that.

A number of third-party options exist, all of which have the considerable disadvantage of cannibalizing standard-issue Macintoshes for their vital parts and passing the cost on to the consumer. The most recent, the Outbound, takes the ROMs from an SE (to which it can be later "docked" for file transfer or desktop operation of the SE).



It's big. It's heavy. It's a true and uncompromising Mac that does real work.

On the other hand, unlike some we could mention, it fits in a briefcase.

The Macintosh Portable has been out for about a year now, and probably hasn't been the runaway success Apple would have liked. It's big. It's heavy, a fact that has apparently established itself in the Cupertino corporate culture—I recently was privileged to hear an engineer explain that "Portable" was now used as an informal unit of measure, as in "The Personal LaserWriter NT weighs one Portable less than the LaserWriter NT." Nonetheless, it's a noble effort; while future generations of Mac portables will undoubtedly be lighter and, ideally, cheaper, they would do well to retain a lot of things that this one does right.

Recently I had the opportunity to go to Japan on a press tour. I wasn't crazy about being Mac-less for a week; I had never gotten into DOS portables, and I knew that much as I love my SE/30, hauling it across Telegraph Avenue is about my limit. So I threw myself on the mercy of Apple's editorial loan department, and the next thing I knew some hapless Apple marketroid's Portable was on my doorstep.

That Portable and I had many adventures. It aroused great interest wherever it went—usually gleeful exclamations of "MACINTOSH!" followed by a horrified, "Too heavy!" and extravagant praise of NEC DOS portables, which gradually fell silent as the joys of the Mac's performance and interface became apparent.

It wound up being very useful and truly Mac-like. It's not perfect and it's probably a pretty early step along the evolutionary path, but it's also a uniquely functional tool here and now.

WHAT'S NOT RIGHT

It is not news to anybody at this point that this machine is heavy. It gets heavier when it has a hard disk. Lugging it through airports is not fun, especially if you're juggling suitcases at the same time (Apple gives you a nice padded carrying case which also holds diskettes, the power adapter, and other small items. The load gets less unwieldy if you leave all this behind). It's lighter than an Osborne 1, by way of putting it in perspective.

The Active Matrix Liquid Crystal Display, for all its sterling qualities I'll mention momentarily, is not backlit. It is, therefore, all but impossible to read in airplanes and other low-light situations. This is going to make the Mac Portable essentially useless to a significant number of potential users.

There are those who also say that it's too big. Personally, I don't find the size unacceptable compared to that of some of the more powerful DOS hard disk models to which this configuration (2Mb RAM, 40Mb hard disk) is comparable. It would be hard to imagine the full-size screen and full-size keyboard/trackball combo in a form factor much smaller, and the large screen and uncramped keyboard are among the Portable's best features.

Some say you can't really use the Mac Portable as a laptop. I used it as a laptop all the time. On the other hand, in fairness I should point out that I'm a sufficiently hardcore lap typist that I used to use Smith-

While future generations of Mac portables will undoubtedly be lighter and, ideally, cheaper, they should retain a lot of things that this one does right.

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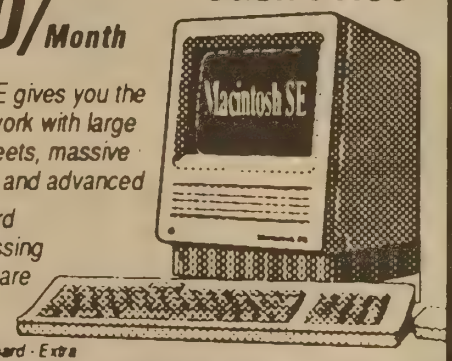

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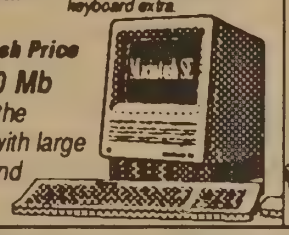

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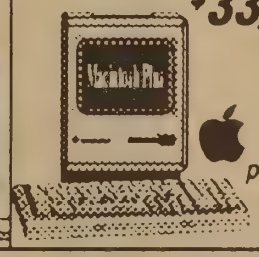

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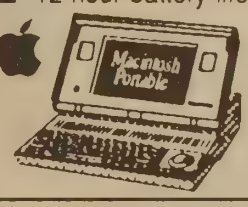

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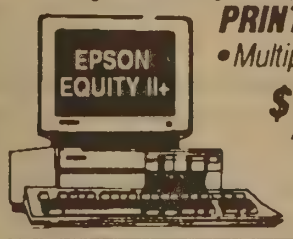

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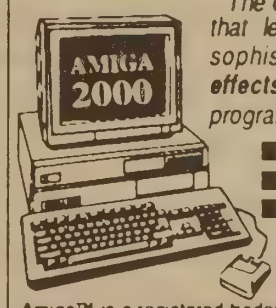

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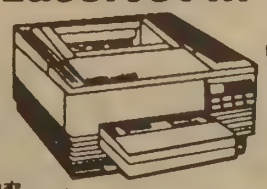

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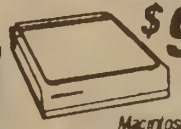

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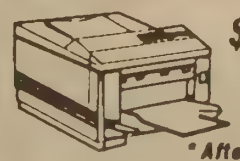

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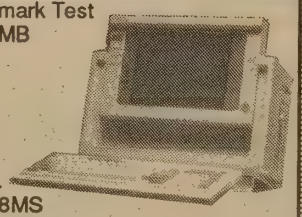

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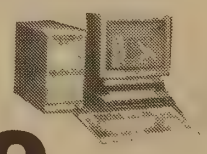

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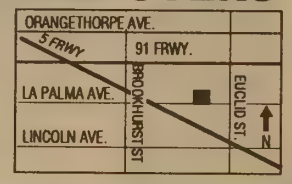

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BUSINESS SOLUTIONS

Corona Electric Portables as laptops.

Arguments go on endlessly about the Portable's trackball—mouse emulation is one of the big design problems in making a traveling Mac, and nobody's come up with a solution that pleases everyone. I've always been pretty happy with the basic mouse and always felt awkward using trackballs, but I got used to the Portable's trackball pretty readily.

ON TO THE GOOD STUFF

That said, there's a lot to be said in favor of this machine. The problem of creating a truly portable true Macintosh is a serious challenge, and sometimes Apple seems to have made less-than-ideal choices for sound reasons.

Take the weight, which definitely strained my relationship with this machine. Most of it comes from the battery, a bricklike device usually used for video equipment. However much you curse that battery as you're hauling the machine around, you'll feel a lot better about it after you've been working six hours and you've still got power. (True, Apple should waste no time about acquiring the technology that allows a Poqet to run 100 hours on a set of AAs, but six hours is a significant improvement over what's available elsewhere, and in my experience it's real.)

And the screen. Not the high-contrast paper-white delight we've come to love on our desktop Macs, and not backlit. But sharp, precise, fast, and devoid of those ghostly trails that get so distracting on other vendors' displays. Wide enough for spreadsheets; wide enough to accommodate several open windows and switch among them in MultiFinder. Wide enough for you to keep the Battery desk accessory on-screen to monitor your power consumption (though, not unlike gas gauges, the Battery DA seems to have an erratic mind of its own). Whatever Apple does about future screens, it should not abandon what's right about this one. We don't need more fuzzy displays with vapor trails.

Other aspects of the Portable show the attention to detail and added value for which Apple often doesn't get enough credit. The SuperDrive that reads and writes Mac or DOS high density disks. The ease with which you can open the machine up, to change the batteries or satisfy the anxieties of bag-

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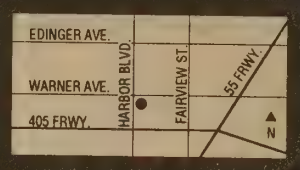

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BUSINESS SOLUTIONS

gage inspectors. The fact that its hard-disk configuration (unlike the similarly priced and ROMless Outbound) also includes a floppy drive. The fact that you can attach external SCSI devices to it, a godsend if you're working with files at clients' sites (again, something the Outbound doesn't do). Although the machine I used didn't have one, the Portable will accommodate an internal modem; the Outbound won't.

I particularly appreciated the largely unsung fact that all Macs including this one have power supplies that automatically adjust to local voltage up to 275 volts. As it turned out, Japanese outlets and voltage are pretty close to the US version and the Mac charged happily in Tokyo; it's nice to know that it would've done likewise in Albania.

For networking, printing, and other purposes, this is a fully functional and uncompromising Mac. Depending on the task involved, it may be significantly slower than your desktop Mac (you almost *feel* the battery driving the hard disk sometimes), but it will not deprive you of any of the functionality and ease of use you've come to expect.

DO YOU NEED ONE?

The perfect portable Macintosh doesn't exist yet. The best solution for you depends on knowing your needs before you buy and figuring out what comes the closest to meeting them.

If you need one all-purpose Macintosh and might have to carry it around occasionally, you'd probably do better to spend similar amounts of money and get a maxed-out SE/30 (4Mb RAM, 80Mb disk). More power, better upgrade path, UNIX capability, etc. However, it seems to weigh at least two Portables, and there's no way you can run it on batteries.

If what you need is something to take a few notes on now and then, move a few files around, and do some telecomm, you'll probably be able to put something fairly economical together with, say, a Tandy portable and LapLink Mac. While you'll have a lot more fun doing it with a Mac Portable, you'll also spend a lot more money.

But if you need those Mac applications, and have to carry a Mac around to various work sites, your options become few, expensive, and fraught with tradeoffs. Within this context, the serious Mac user will find the Mac Portable worth a good look, and quite possibly worth choosing over its competition. ■

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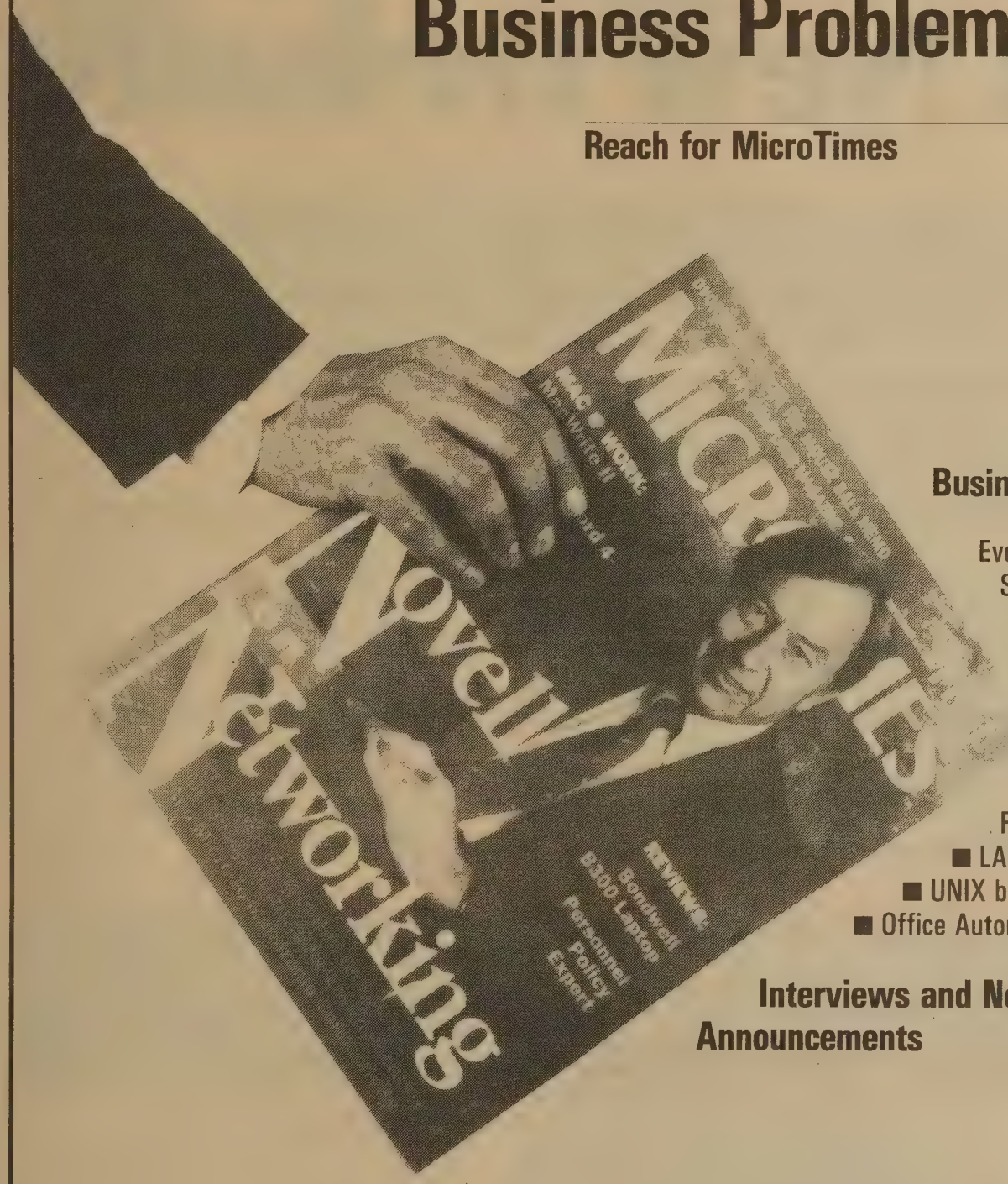

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Venture In A New Decade

By Mary Eisenhart

Venture capital—it's been the lifeblood of many a successful high-tech enterprise. Investors willing to accept high risk in return for high potential rewards were vital to such startups as Lotus, Sun, and other companies that are now household words.

Of course, there've been horror stories. Enterprises that, for whatever reason, went belly-up taking good money after bad. "Vulture capitalists" who oust unwary founders from their enterprise. And lots of struggles that never pay off.

The microcomputer industry has come a long way in the last ten years, and the venture capital community has changed considerably as it looks to the new challenges of the future. In a sadder-but-wiser world, there's more experience to draw on, and there's also a lot less money.

In a changing and increasingly competitive marketplace, venture capitalists are focusing on problem-solving beyond the mere infusion of money, contributing expertise and networking abilities to help their portfolio companies.

For our venture capital profile this year, we feature two young Bay Area venture capitalists who specialize in adding distinctive value to companies in particular niches. Ann Winblad is a partner in a brand-new firm, Hummer Winblad, which invests exclusively in software companies. George Hara has been involved in US-Japan high tech for years and works to help US companies set up joint ventures in international marketplaces. Both have unique expertise and perspective, and offer some useful insights about the issues facing the high-tech industry as it moves into a new and very different century.

Capital

Software Entrepreneur In The VC World

New Venture Fund Specializes In Software Companies

Ann Winblad never set out to be a venture capitalist.

When she got out of college, she got a job as a programmer with the Federal Reserve Bank of Minneapolis. After a year, she quit to start her own business—a decision she attributes at least partially to naiveté: "I think if I'd had more sophistication about starting a business and not been a typical entrepreneur, I would've thought, 'Boy, this is a lot of hard work. Most businesses fail...' But I really didn't know anything about business except that these business classes in school seemed pretty easy, especially compared to the math major."

She got a contract to design an accounting system for a state school, and brought in some of her former colleagues from the bank. Open Systems Inc., a

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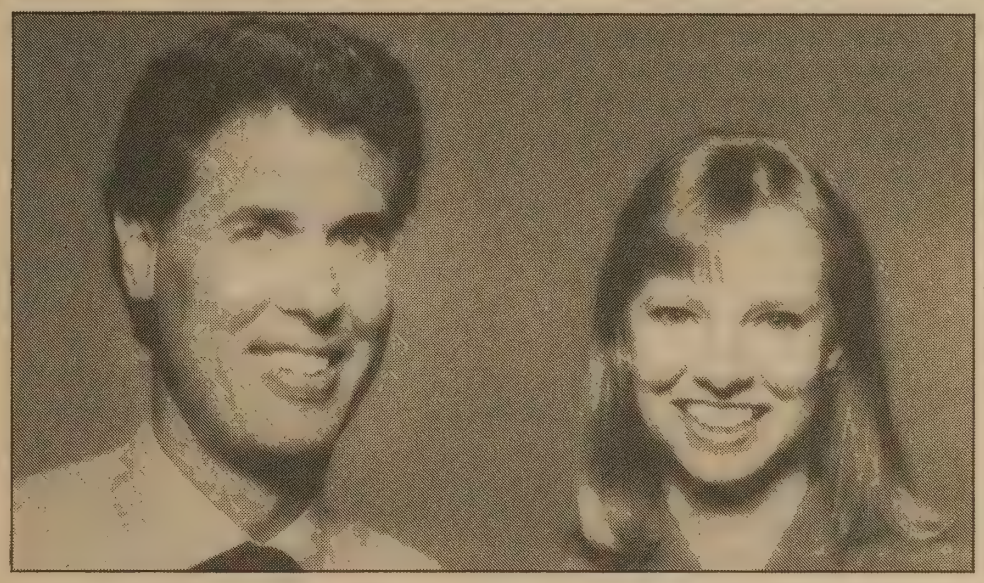


John Hummer and Ann Winblad are partners in Hummer Winblad, a venture capital fund focused exclusively on software.

VC In The Us-Japan Market

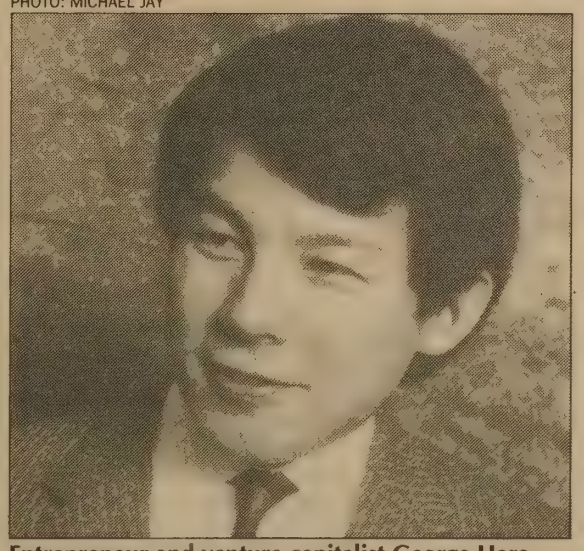
Pioneering The Multinational High-Tech Startup

As a venture capitalist, George Hara has been an investor in such successful startups as the Santa Cruz Operation and the Wollongong Group, and was recently appointed to Borland International's board of directors.

As an international entrepreneur, Hara is the founder, president and CEO of DEFTA/Data Control Ltd., a multifaceted operation that includes multiplatform networking software development, venture capital, and consulting and support services for companies doing business in the Japanese market.

Instead of going into the family business back in Japan (that being Kokuyo, the country's largest manufacturer of office supplies), Hara set his sights on broader horizons. While studying at the Stanford Business School ten years ago (in the course of which he also earned a master's degree in engineering), Hara conceived the idea of what he calls "the multinational high-tech startup," a company that's international from its very early stages and able to draw on the best resources of each participating nation.

PHOTO: MICHAEL JAY



Entrepreneur and venture capitalist George Hara helps high-tech firms in international markets.

In today's increasingly interdependent global economy, Hara believes the time is right for his idea to come to fruition—on the salutary principle that cooperation is often more profitable for all concerned than fighting.

Hara's work in support of such cooperative efforts extends far beyond the operations of his own business. He's served as advisor to the governor of Osaka, a region currently embarked on an ambitious plan to become an international high-tech center, and is a key participant in the Senri Project, a collaboration of private investors seeking to build

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Software Entrepreneur In The VC World continued from page 53

supplier of accounting software, was off and running. "To start the company I borrowed $500 from my brother, which was the incremental cost of incorporating that was not in my savings account. That was our only outside capital, and we went from zero to $7 million in sales in five years."

Winblad ran the company profitably for six years and, in 1983, sold it for $15.1 million. She moved to California, did consulting projects for such companies as Apple, IBM and Price Waterhouse, and wrote a book on object-oriented software which has just been published by Addison-Wesley. And one day a venture capitalist friend asked her, as someone familiar with the intricacies of the software business, to take a look at one of its disappointing investments, a southern California software firm. She recalls being told, "We're about ready to pull the plug on this thing, but we want to make sure that we know how to diagnose death correctly for a software company. Maybe it's just sick."

The patient, says Winblad, was quite dead, but in the course of the extended funeral arrangements she met John Hummer, whose VC firm, Glenwood Management, also had an investment in the defunct company. Hummer wound up taking the software house through Chapter 11 and arranging the sale of its source code to its competitor, constructing in the process a royalty arrangement which has, to date, allowed the investors in the original company to break even.

Hummer, who holds a bachelor's degree from Princeton and an MBA from the Stanford Graduate School of Business (where his MBA class included the likes of Vinod Khosla and Scott McNealy), is somewhat unusual among venture capitalists in having played NBA basketball for several years. He was a partner at Glenwood from 1982 to 1988, and distinguished himself with noteworthy investments, e.g. Octel, a seed deal in 1982 that's now a publicly traded company valued at over $400 million.

"John was pretty typical of most venture capitalists," recalls Winblad. "Everybody dabbled in software occasionally, but nobody really knew how a software company operated, because the genesis of this whole business is semiconductor and hardware. It really is not the same business model as a software company at all. So a lot of money has been lost in software, though some has been made."

She found herself doing consulting for Hummer's fund and turned down the CEO position at one of its companies because she still wanted to work on diverse projects. And when Hummer tried to recruit her for a fund he was thinking of starting, "I said, 'Why would I want to be a venture capitalist? To me that sounds like surrendering to the enemy. I would feel really bad to be called a vulture capitalist.'"

However, in 1988 Shearson started its own fund and recruited Hummer as its head. He agreed on condition that he could choose his own partners, and recruited Winblad with the notion that the firm would deal exclusively with software companies. "It really felt like the right thing to do," recalls Winblad, "and if we could pull off this focus, we would be the only fund anywhere focused solely on software."

By the time Hummer Winblad Venture Partners opened its doors last fall, corporate turbulence had taken Shearson out of the picture, but the partners were working with a $35 million fund invested by such organizations as 3M, Princeton University, and IBM. "As far as I know, we're the only new fund that has been built with institutional money in the last two to three years. We have really great investors," Winblad says.

So far, the company has made three investments in very different companies: Oregon-based Central Point Software, purveyor of the bestselling PC Tools line of utilities; T/Maker Company, publishers of WriteNow and the ClickArt series; and Slate Corporation, a startup in Scottsdale, Arizona specializing in application software for computers that recognize handwriting input. (Slate's founding team includes Dan Bricklin and Bob Frankston, creators of the first spreadsheet; Vern Raburn, current chairman of Symantec; Thomas Byers and Dorothy Hall, formerly of Symantec; and Mitchell Stein, creator of the TrueForm forms processing program.) Winblad serves on the board of directors for each company.

The partners are about to relocate their headquarters from San Francisco's Financial District to new offices in Emeryville because, Winblad says, the concentration of software companies and the support services they need is quite good in that area. "There's hardly anywhere left in the Bay Area where a software company can have inexpensive office space, fairly inexpensive housing, and some density of people moving in and out that they can use as contractors. The Berkeley-Emeryville area has pretty much stayed like that, so it's a really great place for us to be with critical mass in one community."

As a brand-new VC firm, how did Hummer Winblad succeed in attracting funding?

We were fortunate that we had early commitments from three venture firms who have a total of $2.5 million in our fund—Sequoia, Asset Management, and Bryan and Edwards. Also, early on we got a strong commitment from 3M Corporation and IBM Corporation.

With that early momentum, we were able to build towards our final fund size of $35 million. With $35 million, we should be able to fund 15 to 20 software companies, which is a substantial number.

Last year, for example, there were just over 30 seed deals done, meaning brand-new guys with business plans saying, "Here's a plan, I haven't done anything yet, but we're a good team and we can really do it." In all areas—biotech, hardware, software, anything high technology. That was down from the year before, where there were only 43. So it's harder and harder for young companies to get capital from the venture firms, especially at the early stages.

One of the reasons we were funded, I think, is that our limited partners believed that this is a new business for us. We've both been very successful in our careers to date, and we have a vested interest in proving we can be successful at this venue as well. So we will work harder than someone who's maybe in mid-life in the venture community.

We were competing with some of the venture firms that did not do well in returns in the 1980s. There wasn't any extra money on these tables saying, "Well, I hope a new fund shows up so we can give them this money." It was more like a game of musical chairs. Last year the number of chairs got smaller, and when the music stopped, if you happened to be sitting in a chair you got the money. At the time we were raising our fund, there were 140 venture funds raising money. Some of those were funds that had been around for a while that did not get refunded.

We probably gave, on the average, five to seven presentations to each of the people that committed to our fund. We hauled out the dog and pony show. We completely wore out a slide projector. It took us a little less than nine months to raise the fund.

We've been seeing companies since October. In the first six months, we reviewed the plans or saw 160 software companies, startup and existing. We funded three of those companies.

What advantages are there to concentrating exclusively on software, and what do you hope to be able to achieve by doing it?

Oh, the advantages are tremendous. Every day all we think about is software. We do field trips—we spent half a day at MIPS the other day, we spent a day at Sun, we spend a lot of time with Apple people. So we're not too far away from the hardware people selling the machines that support the software that we invest in.

Many of the things that we see that cross our desk aren't even plan-like—where people may send us a two-page fax saying, "I'd like to talk to you." We really encourage people, before they spend two months holed up writing their version of the Business Bible, that they give us a preview with a few pages of facts so we have a basis on which to talk to them. To say, "Well, do you have a business, or do you have a product?"

I would guess that we see a lot more products than we see businesses. We'd also like to see many of these products live. For example, we have brought at least one product acquisition to Central Point Software, which was one of our first investments. A young company that wasn't really looking for very much capital and would have had a tremendously difficult time competing in the distribution channel with Central Point, Norton and Fifth Generation. One of the programmers and key architects is already employed at one of our companies, and it's likely the other will be employed at one of the other ones.

So even when companies have ideas which for a number of reasons may not get financed, there's so much leverage and capability for us to get people connected the right way with products or people. That benefits not only companies that we've invested in, but other companies we work with in the software community as well. That leverage would not be enjoyed at all if you had a diverse portfolio.

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Every time we see a software company, we learn something about the dynamics of the software business. We're always moving further into the future every day, where people have these seed deals where it'll be one to two years before the software comes to fruition. We become permanent members of the University of Software by doing just software deals.

We leverage all our contacts as well—when we do good deeds for the software industry, they're returned to us. It's not disconnected, like if we spent one hour on biotech, and the next hour on semiconductor companies, and run off and really figure out how modern fab plants work. Everything we learn about how companies grow, we can contribute to the smaller companies.

One of our investment companies has one of the best MIS systems I've ever seen for processing orders, for doing their accounting, totally real-time and really good. They built it themselves, and they're happy to license it to the other software companies we've invested in at a very reasonable rate. When there's a dynamic—people, technology, issues—we can really network our own portfolio companies, as well as the people we've gotten to know in this industry.

Many of these companies don't need very much money. When we invested in Central Point Software, they had a very robust balance sheet. They really didn't need any money, nor did they want any money. So over a six-month period we said, "Pretend we're investors. Give us some tasks. See what we're made of. See if there's value added that we can deliver beyond money." They gave us assignments; we helped out with a number of things and showed them that we were a little bit further along on our maturation curve and our knowledge of how companies work; we had some long-term connections in the software industry and a knowledge of how things work, so they could get up on the learning curve faster by being associated with us and having one of us on their board.

We like to do a lot of that. We like to prove to companies that don't need money that perhaps it's of value to have them sell less than 15% of their shares to us, get us on the board, get us involved. Have all this leverage from us spending all of our day looking outside of their companies funneled into their business as well.

We can't just have one person working on software to make that happen. That person would die. We think that we can work closely with a number of companies, that we can prove that we can yield value beyond money. But that takes time, persistence, and a lot of looking around to see who those companies are.

You have three very different companies in your portfolio currently. What were you looking for, and what attracted you about them?

Central Point is fairly obvious in that they are really an up-and-coming company. They had $24 million in sales last year, and 22% after-tax profits. When we invested last year, they appeared to be overtaking the market leader, Norton, which they did. They also really hadn't even caught the height of their growth. They have over 40 developers in-house; operationally they're incredibly sophisticated and efficient. We love the CEO and founder, Mike Brown, and the president, Corey Smith.

People, cohesion, the ability of the people to work together, technology—it was all there.

Did you see *Field of Dreams*? We ask new companies with just seed deals: "If you build it, will they come?" If they can answer yes, then we'll probably invest.

We also look at cohesion, how well the people work together, because that's very, very important. All those things were there with Central Point. Central Point has just finished its first quarter this year, $16 million in sales and in excess of 22% in after-tax profits again. So Central Point will match all of last year's revenue in almost the first five months of this year; they are on a very fast track, they are well managed, and they're young, so there's a lot of energy and willingness to grow and commitment to the business for a long period of time.

They built their European subsidiary over the last six months, and I just visited their European headquarters to meet the people there, and see how real Europe was. It's very real. So Central Point will do a little more than double their total revenues, and they will triple their European revenues, which will go from 20% of revenues to 30% this year. It's a very focused and well-managed effort.

T/Maker is a little company, with $3.2 million in sales last year. I'm happy to report that this year in the first five months they've already done almost $2 million in sales, so they'll double their revenues this year.

There, we saw a company that has outstanding management—Heidi Roizen is a product in herself, and Royal Farros is incredibly committed to product and product design, and very good at it. They really wanted to make a commitment to growth—I think that one of the reasons is that they saw a lot of their young associates growing companies and getting paid for it in the sale of their companies or public offerings. And they realized to reach that goal, the financial rewards in this business, they'd have to make a commitment to growth.

Which is something of an about-face for a company who sold First Publisher to Software Publishing rather than make T/Maker grow too fast.

Exactly. We don't like to invest in companies where their main motivation is "I want to make a lot of money." We have to see a healthy amount of greed there; there has to be some goal. But most of the companies need to want to win. That's what motivated me in running my company—then one day I got a very large check for winning.

You have to kind of be motivated that the prize at the end might just be a piece of paper saying "You won." Or the prize at the end might be a lot of money. In this business it tends to be a lot of money, if you really, really do a good job. But for the people that are really involved in the industry, that's so secondary to the idea of really competing.

I can honestly say that I was a real entrepreneur—the company started in my house, three of the bedrooms were offices, I slept where I went to work. We were a sweat equity startup. And why would somebody do that to themselves when they could go get a really high-paying job? Because most of the people in the computer industry are pretty smart; they can

"We don't like to invest in companies where their main motivation is, 'I want to make a lot of money.' We have to see a healthy amount of greed there; there has to be some goal. But most of the companies need to want to win."

all go to work at really high-paying jobs somewhere. But instead they dedicate great portions of their lives to growing companies.

A 35-year-old friend of mine has $30 million in net worth right now, but it occurred to him the other day that the people he really likes are 30, not 35, because for five years there was something that really didn't happen for him because he was just there in front of his terminal, not living life at all. We're not asking people to give up their lives, but we have to see that the motivations are really high and really strong.

The really nice thing about this industry, especially software, is that if you do a really good job, you are extremely well rewarded fairly quickly, compared to many other industries.

Slate, on the other hand, is a longer-term project, being dependent on hardware that isn't there yet.

Probably only 20 or 30 companies will get seed capital this year. This will be one of them. We funded this company with Kleiner Perkins; both Kleiner Perkins and Hummer Winblad have a board member on the board of Slate.

Of the three companies we have completed deals with now, this is the highest risk. But the highest risks also yield the highest rewards, potentially. We really invested in people in this case. I've known Vern Raburn, Tom Byers and Dottie Hall for a long time, pre-Symantec. Dan Bricklin is probably one of the best engineering managers, let alone one of the best design guys, in the industry. We've been fortunate to recruit Bob Frankston, essentially Lotus's chief scientist, into the company.

Dan Bricklin, the creator of the spreadsheet, is now 40 years old. He's the kind of guy where you say, "Dan, you've got a lot of this application written by three new programmers. Are you sure we'll be able to use this code?" And Dan will say, "I read every line of that code on the plane out here. I've done a complete code review, and yes." Not like, "Well, I suppose so..."

Here, the things I think are the risk factors are that we're dependent on external events. We hope that the hardware catches on and comes to market in a reasonable period of time. So we're depending on other startup companies being well run and being successful. Like Go Corporation, and some of the

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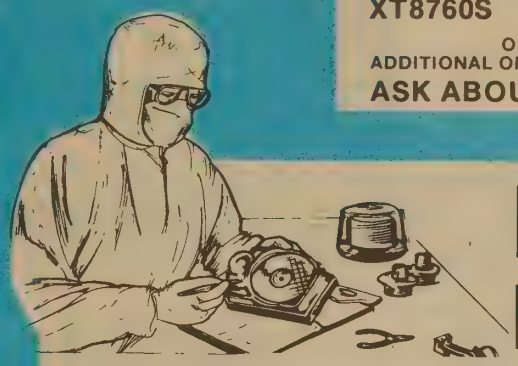

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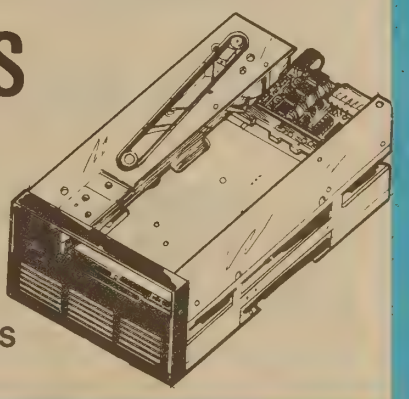

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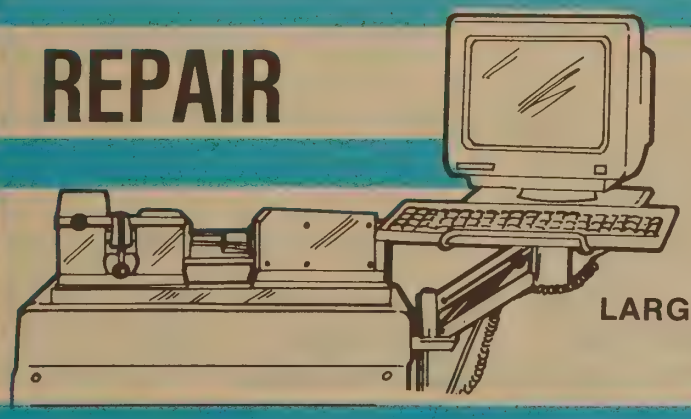

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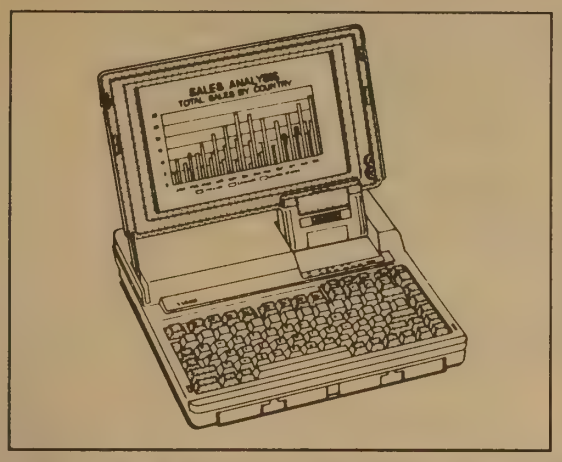

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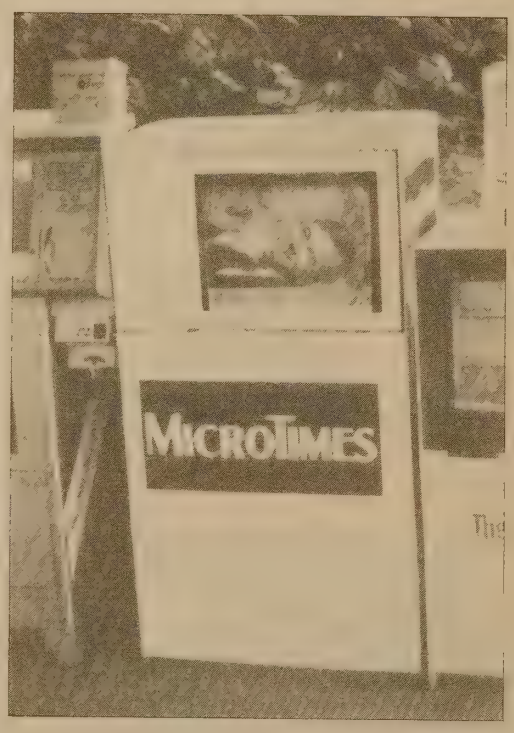

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Japanese technology like the Sony Palmtop, or GRiD getting the next generation of the GRiDpad out. We don't have much control over those events, so we try to be allies of those companies and work as hard as we can for them as well.

This team is an incredible team. It's not like a seed deal where two programmers from Bell Labs come in and then they say, "We've got this great product; by the way, how do you start a business?" There's none of that here. There's also not any laziness—they're all taking this very seriously.

And we're very serious board members as well—it's our responsibility once a month, in phone conversations and in meetings with them, to ask the serious questions. To be the people that don't have to have our nose to the grindstone every moment so we can look around.

In companies or individuals that might approach you for funding, what are you looking for?

We want to be able to say that this company is going to have an unfair sustainable competitive advantage. At the end, after we do all the due diligence, we ask ourselves that question.

What does "unfair" mean?

That nobody else will have it. Where the competitors will say, "It's not fair—they have this." It means an extra competitive advantage.

They might have access to some technology. They might have a closer relationship to a hardware vendor. But they have something that the other competitor cannot get.

We really look at three things—the team, the technology, and the fit of the product to a market. The team's really important, and the team might be one person. The product might be one product.

When it's brand new, when it's not an ongoing business, we probably also will try to figure out what the milestones are, and determine how many milestones we'll fund to, to build value so the company doesn't need to sell as much of the company to venture capitalists at the lower rate they would get as a new company. We'll figure out what is the milestone to the next value, and fund to that, or maybe the first two, so that when additional capital is needed, it can be funded at a higher valuation.

That's very beneficial to the entrepreneur—I think it's really a bad idea for startups to go in and say, "Oh great! I want $2 million and I just got it, and I gave up 60% of my company."

A lot of people come out really unhappy from deals like that.

But they do it. Nobody forces them into it, and they do it. And they should think about walking away, or find some other way to make sweat equity get further, because it is really, really hard. Once you give up that first 60%, you may need additional money. Then you're down to where you only own 10% of the company. Which might be fine, but I think you're a lot more motivated if it's yours. You don't want to come in and say, "Oh gosh, what are these VCs going to tell me to do today?"

There's an excellent article in *Upside* magazine about this—these MBA-type VCs are on boards, and they have these kind of snotty attitudes about "Hey,

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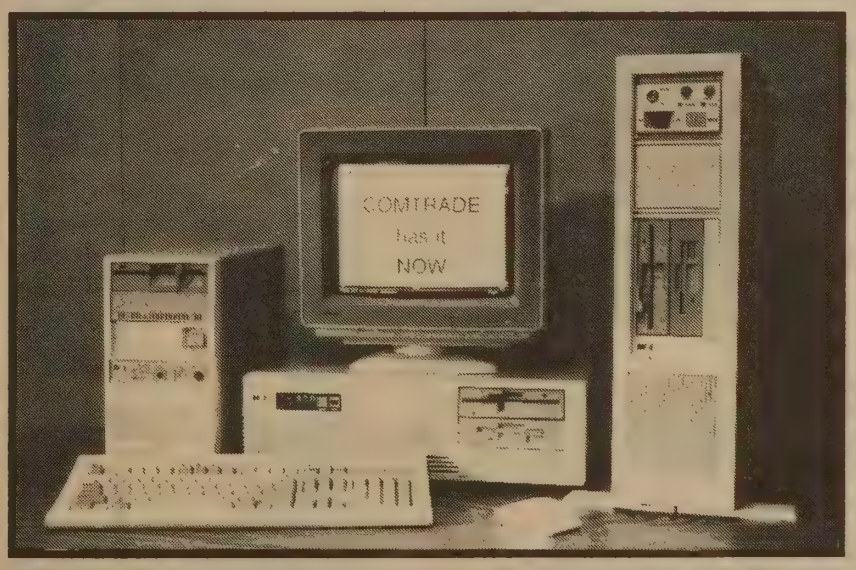

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PIANOMAN & PLAYER PIANO 4.0 (#126-127) Create musical tunes at your keyboard. Includes tune files to play or edit.
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AUTOMENU (#73) Creates a custom menu with its easy to use command language.
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All of the software listed here, requires a minimum of 512K plus an 800K floppy drive.

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HUMOR (#6114) Several home movies on your Mac screen!
CARD GAMES (#6056) Play Golf, Klondike, Canfield, Hearts, Euchre, Blackjack, and more.
RISK & STRATEGO v0.95 (#6236) The classic military strategy games of Risk and Stratego on one great disk. Requires System 6.0 or higher for sound.

Note: all the programs listed in this category require the MacPaint program, sold commercially.

CARTOON ANIMALS (#6071) This disk is packed with some of the best MacPaint cartoons ever!
BORDERS (#6075) Add extra punch to signs and memos!
FAMOUS PEOPLE (#6087) Have all your favorite people in the palm of your hand!
CARTOONS (#6089) Reach right into the comic books and grab your favorites!

Note: all the programs listed in this category require a Macintosh II or higher with color capabilities.

MAC II COLOR GRAPHICS UTILITIES #2 (#6222) Multi-format picture viewer/converter, a scanned image colorizer/processor, a grayscale utility, and more.
MAC II COLOR GRAPHICS UTILITIES #3 (#6223) Color and large display utilities for Mac users!
MAC II COLOR IMAGES #1 (#6227) This disk is loaded with images, arranged by folder.
MAC II COLOR GRAPHICS UTILITIES #1 (#6219) Five great utilities that utilize the Mac II's spectacular color capabilities!
MAC II STARTUP SCREENS (#6224) This disk is a collection of 5 fantastic full color startup screens! They all utilize the 256 color spectrum for some really fantastic images.

Note: all the programs listed in this category require the Hypercard program sold commercially.

HYPER BUSINESS #1 (#6120) All the stacks every business user should have!
HYPER BUSINESS #2 (#6121) A large collection of stacks. UPS, Speech Writer 1.0, Loan, Super Memo Pad, and more.
HYPER BUSINESS #5 (#6125) Contains two excellent desktop publisher's stacks.
HYPER BUSINESS #6 (#6126) Another excellent disk packed with desktop publishing stacks!
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we've got clean hands, and this is the way you do it." Versus people who really came from the trenches.

I think it's a very difficult decision for someone who's been successful in their own industry to think about being a venture capitalist, and I wouldn't be one if John Hummer hadn't pounded on me for three years. And now I'm really happy that I'm a venture capitalist.

In 1981 we had venture capitalists come to my company and say, "We want to give you money." We said, "We don't need any money, but there must be a lot of easier ways to do a lot of the things we're doing. Do you know what they are? Help us! We're in Minneapolis, not Silicon Valley—if you can tell us how these things can be done better, we'll give you our shares at an incredibly low valuation."

I remember my partner saying, "These people can't help us at all; they don't know anything about software." They wanted to invest in the company because we were a good company, and anyone who would've invested at that point in time would've made a bunch of money, because we did sell our company for quite a high price. But I think that venture guys have to demonstrate that they're going to work hard for these companies and that they have value to add, that when push comes to shove they're going to go out and help recruit people, they're going to call up the people they know in the software industry, they're going to help them with acquisitions, they're going to deal with a whole lot of problems that you don't know till you meet them.

At Central Point, all the people running the company are in their early 30s. Mike Brown is 32. At T/Maker everyone's 30-32 as well. I started my company when I was 24, so by the time I was 30 I'd run a company for six years, so I have five or six years on most of the people who are running these companies. Those years I learned a lot, and I didn't know any of that stuff the first few years. They don't teach you much of this at the Stanford Business School. You have to learn it by doing.

Also, we use a lot of advisors to our fund. Charlie Jackson of Silicon Beach is an advisor to our fund. Charlie is really hardcore—it was a sweat equity startup, he had one small investor in the company, he really, really worked toward profitablity. Profit early on is key for software companies.

He's looking at a company for us today. We've already done the due diligence; we've decided the team is really good, we've decided the technology is good. We are not sure about how the product is going to fare outside of the Macintosh market, in the Windows and OS/2 market. We have our opinion, which is fairly high, and we use Charlie as kind of, "Does Mikey like it?"

We don't think we're omnipotent and know everything, but we want to bring as much strength to our investments as possible.

On the whole, do you think it's more difficult for a startup to be successful now than it was, say, five years ago?

I think that starting a new company in any business is difficult for anyone. I think the thing that people have to realize is that usually there's no immediate hits here. Central Point was founded in late 1982; it's seven years old. Microsoft was founded in 1978 and it was eight years later, in '86,

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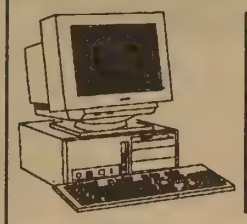

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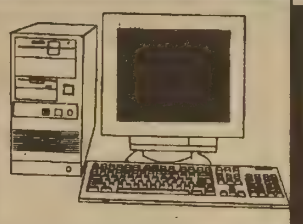

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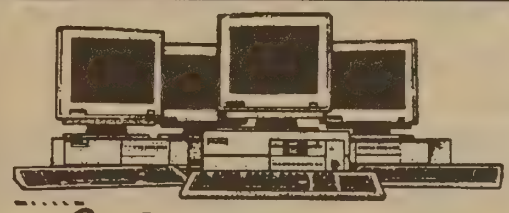

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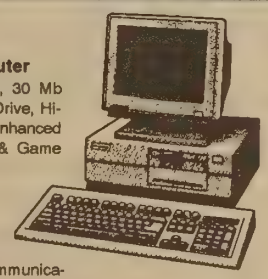

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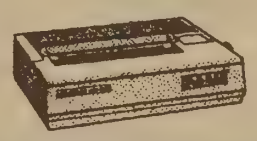

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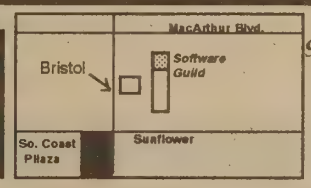

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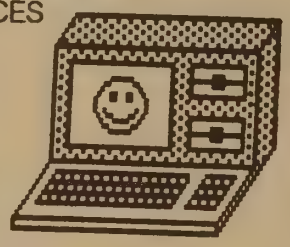

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that they went public. People forget that these are businesses where it takes a while to build a franchise, to catch your stride from Release 1 of the product. Charlie's business was a few years old before it hit its $11-12 million mark in revenues.

It's fairly easy to get to about $3 million in sales; it's much more difficult to crack 10. Once you crack 10 you've got a real strong chance to really start moving on to the $20-30 million mark. Then of course there's the next critical mass thing, which is—do you have enough diversification to lead you to $100 million, or are you stuck?

We've had some really bad stories, like WordStar and Digital Research, where they looked like they were moving right along, and all of sudden it was like the edge of the cliff and they just fell off. Those are really horror stories for a lot of software companies, but we can learn something from them, that technology marches on and you have to keep marching. This is not something where you build a La-Z-Boy and someone's going to buy that ugly old thing forever because there's a lot of old people who like to lean back in their chairs and the design pretty much stays the same. There are very few things in the software industry that stay the same. So keeping a high quality set of programmers, recruitment, and keeping your quality standards as you grow, is really key.

For people wanting to start a company—it is very difficult to get venture financing, and companies, when they go off to do that, will spend three to seven months getting financing, even the ones that are really good companies. And some of them will go the whole way and get rejected. So it's important, if you want to get started, that when you go out to raise venture money, you have a contingency plan. If somewhere along the line it appears that you're not going to get the money, you know what you're going to do instead.

It's also really important, when you go to raise venture money, that you know it's going to take a while. We have to check out the people, we have to check out the users, we have to check out the technology, we have to size the markets. We want to make sure that when we sign up for the risks that are ahead, we signed up because we really believed in this. We signed up knowing a lot of the pitfalls, even the ones that you didn't point out, so we can help you navigate around this minefield called the software industry.

Is there room to grow big companies? Absolutely. If you compare it to what was running five years ago, almost all the software that exists today is incredibly different, and the software we'll see five years from now will be incredibly different. The idea of having integrated multiple data types—image, text, numbers, multimedia—who thought we'd have all this inter-application capability with diverse types of data? I take for granted that I can clip drawings and images and graphs and charts into any kind of word processing document, and that was almost a whole new set of companies that created that capability in software. And there's more and more capabilities to come in software, so I think the opportunity to build a $100 million company here is there.

It's not going to be there for 50 companies. (Hummer Winblad Venture Partners, 415/931-5579; Fax 415/931-6137.) ■

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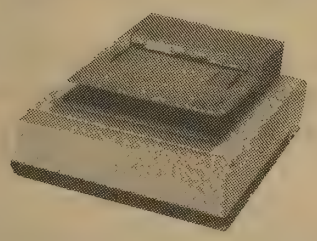

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VC In The Us-Japan Market continued from page 53

a full-service international high-tech city. He's also worked extensively, twice as chairman, with the Alliance conferences, which are held each year in Japan to bring together US and Japan companies as possible collaborators in joint ventures. The grassroots networking approach of the Alliance conferences found favor with many businesses; Texas Instruments Asia president Norman Neureiter wrote Hara, "Let me compliment you on devising the 'Alliance' approach to solve the problems of bringing smaller US companies into productive contact with Japanese companies. I believe you have found a very useful mechanism."

While the richness of the Japanese marketplace is legendary, many US companies find it all but impossible to penetrate barriers between them and their potential customers, from cultural difference to distribution channels.

Hara contrasts, for instance, the different experiences of Apple and IBM in the Japanese market to date. Apple has historically given very little autonomy to its local operation, and the constant upheavals and policy shifts from Cupertino have not gone over well in a distribution channel whose watchword is stability and responsiveness to the local customer. On the other hand, when the PC came out in 1981, IBM took a big risk in listening to its Japanese management, who said the machine, lacking a mouse and Kanji capability, was wrong for the Japanese market. It allowed them to develop the incompatible 5550 series, which runs Japanese MS-DOS and did quite well.

Creating an international win-win situation is a tricky undertaking in an era where politicians garner easy votes with Japan-bashing (and their Japanese counterparts often do likewise), cultural misunderstandings abound, and most of the participants are dealing with the problems of a startup business anyway. But Hara's committed to furthering the process.

"To change the politicians' mind is very difficult," he says. "But by creating thousands of strategic alliances between US business and Japanese business, and entangling their interests, that's another way to stabilize economic and political conditions. That is a grassroots-type activity, so it takes a longer time, but I believe it is much more effective than just creating treaties between US and Japanese governments that can be changed overnight."

What was the idea behind the multinational high-tech startup theory?

When I came to Stanford about ten years ago, the first thing I noticed was a different attitude of the students in Japan and the United States. Usually the best students of the good schools in Japan all want to enter large corporations or the government. But at Stanford Business School there were no such students; they all wanted to go to the smaller companies, or start their own eventually, although they might not be able to do it immediately after they graduated.

So I was very interested in such a difference.

Also, that was 1979. Steven Jobs started Apple Computer in 1977. He came very often to Stanford, and other entrepreneurs too. And their appearance was so different... I was very shocked.

I started to interview those entrepreneurs in the Valley, and found out that many of the smaller US companies have been successful within a couple of years, growing up to more than $100 million in sales in two or three years, from scratch. That never happened in Japan.

So I started to be very interested in how they did it, and I found out venture capitalists were backing those entrepreneurs.

And this is not common in Japan?

At that time, there was no venture capital. Even the term venture capital didn't exist. I didn't know the word either.

Japanese venture capital firms are all owned and started by Japanese financial institutions. As a result, the top management of Japanese venture capital firms are all appointed from their parent companies, where they are trained risk-averse. They do not take any risk to help the early startup. So if you take out the portfolio of Japanese venture capital companies, it's all medium-sized companies with long histories, 10-20 years, not growing fast, but with little chance to go out of business.

The role of Japanese venture capital is completely different—they are not so much interested in helping from scratch; it's to find out if the company has an opportunity to go public and introduce it to their parent companies, so the parent company makes money.

The Japanese investor is more security-oriented. More conservative and more long-range. In the States, it's very challenging. I think the West Coast, California, still has the frontier spirit. Many people are starting new companies in this particular area. Lawyers and bankers and media people and others are all set to help the entrepreneurs. That's a major difference. In Japan many people think of starting new companies, but they cannot get support.

I started to analyze the important ingredients to start new companies. We have to have the people—the entrepreneur. The idea, technology. And money—capitalization. These three are available here, and they can be called the three static ingredients to start new companies.

After startup, you have to have the three dynamic structures—research and development, manufacturing, and sales and marketing. In Silicon Valley, the three ingredients to start new companies are available, but many startup companies grow to a certain extent, then often they are acquired by large corporations, or they cannot grow in certain areas.

There is no person who is almighty in everything. That can be applied to countries too. In this area, no engineers are really interested in working on the factory floor. They're all interested in going into design. But in Japan, the best students in engineering departments are willing to start work as floor engineers, to increase productivity and such things. So it seems to me that many engineering students in the US cannot contribute to strengthen US manufacturing abilities.

And also the salaries paid to engineers here are lower than those paid to MBAs. This is not true in Japan.

Maybe the United States is interested in changing that kind of thing and strengthening US manufacturing capability in the long range, but it's difficult to change it instantly. The best way is to combine the best parts of both worlds—the entrepreneur spirit and venture capital in the US, but after establishing the company here, maybe keeping the research and development in the United States is better for attracting good people, but manufacturing and product development is something Japan might be better for than the United States.

This is limited to the very complicated electronic devices only. With less-complicated products, manufacturing might be optimized in developing companies. By combining the best part of both worlds from the startup stage, we are able to maximize the growth of the companies.

Are there any examples of companies operating this way?

In 1981 there were no such examples, and I started my own, Geekee Fiberoptics. In that case, I had a research and development group here, a manufacturing group in Japan, and a product development group in Japan too. The manufacturing group was in Korea. It was very successful—we operated that company for two years; I wanted to do an experiment before I started my venture capital firm here. We invented a fiber optic medical sensor that measures the carbon dioxide and hydrogen and oxygen gas pressure in blood.

For people thinking of selling high tech products in the Japanese market, what differences should they be aware of?

For anything that involves hardware in high technology, Japan is a much more quality-concerned country. Quality control is very important. In the software area, in telecommunication software systems and biotechnology, the United States is much more advanced. But in the hardware areas, it's very easy to get caught up by Japanese competitors, and it's really difficult to protect your hardware design by patent.

From my business experience here, it seems that Japanese large corporations are more security-oriented, and anybody in the company is not interested in taking risks. And also they usually require consensus-based decision making. A company that has inexpensive, excellent, and on-delivery type product that is easily accepted by a US company will find that it cannot easily be accepted by a Japanese company, because they are so concerned about the size and history of the US company.

So if you're an American startup, how do you deal with that situation?

With education for both sides.

US companies, even when they are small, are very confident in their technical competence, but they

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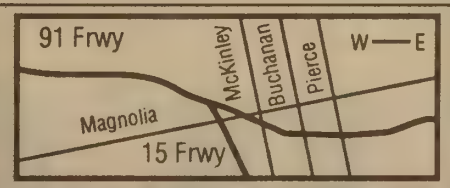

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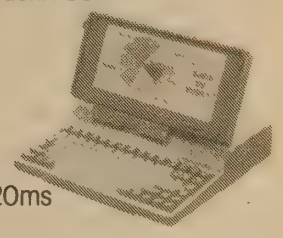

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are not concerned about size or history. The Japanese large corporation is very concerned about history, size, sales, profitability. Sometimes the age of the president is important. So we have to tell both sides the differences of values in each country, and try to help them understand.

On the Japanese side, consensus-based decision making is usual. If the US company has a good contact in the States, the information-gathering office of the Japanese manufacturing companies in the States come to the US smaller companies and get excited about the US product, the US companies think optimistically. They expect what would happen in the US companies to happen in the Japanese company, but it never happens, because information is given to the Japanese companies, and starts from the bottom. And if the technology is complicated, it's diversified into various areas. So in the case of medical electronics, both the medical division and the electronics division have to have a consensus-based decision in trading companies.

And while the decision-making process is developed in the Japanese companies, ususally there is not too much communication. The decision process is not disclosed to the US counterpart, and the US company feels very isolated and neglected, and gets frustrated. Sometimes US companies start to send very strong letters to the Japanese party, and that makes the Japanese party angry. [Laughs]

So they very often come apart because of differences in business practice. Education for both parties is really important.

With US small companies, the quality of the company might be better than the big companies in the States in terms of education level and those kinds of things. But in Japan, usually small companies are considered second-rate—when Genentech was very small, many Japanese large-corporation pharmaceutical companies were not able to believe that such a small company with less than 100 employees could do what a large Japanese pharmaceutical company could not do. It can be said of electronics and software companies, too.

In creative areas, consensus-based development research cannot work. It doesn't work. That is not understood well by large Japanese corporations.

What companies are you involved with as a venture capitalist?

Companies like the Santa Cruz Operation and the Wollongong Group, mostly system-level software companies. I usually start investment at an early stage and help them as a director of the company. It takes five to eight years, I think, to go public, but I'm really interested in the development process of those companies. With my background of overseas activities, I try to help them create a strategic alliance through my personal contacts if they need to have a strategic alliance with a European or Japanese company.

How did you become involved with Borland?

I'm a member of the board of Borland. I think the president, Philippe Kahn, would like to have his companies be globalized companies. He wanted to have optimized representation of the various nationalities—United States, European countries, and Japan. I was formally appointed to the board April 1 of this year.

He is thinking to become the most successful application software company for PCs after Microsoft, not just in the United States but in Japan and the European countries. His company has a great chance in the database market, for instance. So he wanted to create the strategies to develop the Japanese marketplace very correctly from the beginning, after seeing some of the previous examples, such as Apple and other companies.

I really hope Apple Computer is going to succeed in Japan, but as long as US headquarters keeps their policies inconsistent and doesn't support its distributors and resellers, and makes decisions without consulting its distributors, they may lose their credibility. Not from the end-user, but from their distributors. Since the local president is supposed to know the best way to optimize a market, he should be given more authority to make decisions, even to go against the US headquarters without being fired.

Mr. Kahn expects me to give a lot of advice in the development of the Japanese marketplace, and the creation of strategic alliances with Japanese hardware and software computer companies, and some additional advice about his activities in the United States, especially the margin acquisition field, which I specialize in.

What sort of products is the Japanese market particularly interested in?

Anything that is software. Software which doesn't have the character difference. Word processors are different in English and Japanese, so simple localization and porting doesn't work, you have to change all the logic.

But graphics and operating systems, communications, networks—these are all very advanced in the United States, because the entire US environment allows the single individual to invent new ideas. But in Japan, such a genius individual is not usually well accepted by the organizations. It's a very creative field, and that is not the outcome of consensus-based creativity. It's a single-man creativity, and in this field the US is much more advanced.

These kinds of products are missing in Japan.

Do you see this as a long-term situation? I read periodically that the Japanese are very aware of this creativity gap and trying to address the problem.

Many large corporations have started to be aware of very interesting things. They send young engineers to study American institutions. They wear ties and suits in Japan, but they wear jeans and start to have their own individual creativity again in the US environment. But when they go back to Japan, the creativity they developed in the States is killed in their organizations.

Some Japanese companies—although they cannot allow individualism in their companies in Japan, because it destroys the entire organization—are starting to establish central research facilities in the States, filled with lots of American researchers. They bring Japanese young people and have them develop their creative ideas. It's starting to work. So any creative Japanese people should come to the States. I don't think the corporate culture of large Japanese corporations helps creativity.

"If you take out the portfolio of Japanese venture capital companies, it's all medium-sized companies with long histories, 10-20 years, not growing fast, but with little chance to go out of business."

Although many American papers write that the Japanese are missing creativity, I don't think that's right. Because if you interview Japanese people, they show a lot of creativity at the individual level. But in the large corporations, if they are interested in being promoted, they should not show their creativity or uniqueness, because being different is not appreciated in Japan. Although many people in Japan write about the importance of creativity and uniqueness, that is just words. If anyone actually starts to show creativity or uniqueness in the organizations, they are immediately, I think, put off the mainstream of the promotion line and labeled weird persons and demoted.

So while they are trying to hide their creativity in the large organization as they're trying to get promoted, many originally creative people just lose their creativity. Only well-rounded average people have a chance to be appointed members of the board of directors.

For instance, if you interview the branch managers of large Japanese banks, you'll find lots of interesting people. But these people never go back to headquarters. They are sent to the subsidiaries or customer companies. Only people who hide their creativity are called to go back to headquarters and promoted. If you interviewed the top executives of large Japanese financial institutions, I'm sure you could not find any interesting people.

Out in the Valley you hear a lot of people griping that the Japanese are taking over anyway, and why should we sell our technology to them? Do you encounter this attitude, and does it cause you problems?

Although politicians say so, actually when I interview many US entrepreneurs, they do not think so. Most of the American entrepreneurs are worried about being acquired in a hostile takeover. An entrepreneur's goal is rather more long-term than it is for finance-background people. So if US investors are involved in high technology companies, before the entrepreneur has accomplished a certain goal, US investors tend to sell the company to other companies.

If we take a close look at the US economy—the mergers and hostile acquisitions and leveraged buyouts—these kinds of things are really destroying

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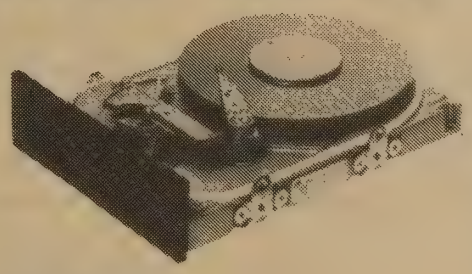

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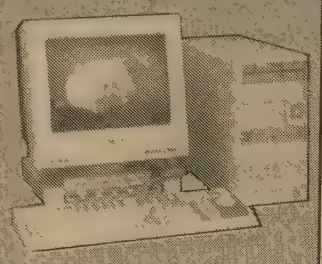

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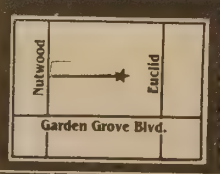

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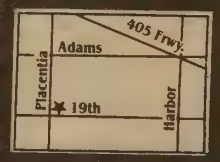

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the potential of US engineering strength that is usually nourished by the small companies. MBAs try to calculate everything, but a number of good things cannot be converted to numbers. Creativity on the engineering side is more advanced in the US, but in business and finance I don't think the US system is good.

US entrepreneurs are really looking for long-term, stable capital from investors, but now, even from US institutional investors, it's very difficult. But with Japanese investors, it's easy—they don't care so much about financial performance. As long as the entrepreneur shows a certain goal in five years, they don't worry so much about profitability in the process. And it helps.

US venture capital is important to start companies, but after the second or third round of financing, instead of taking money from US institutional investors, maybe the company is better off having Japanese long-term institutional investors as stockholders.

There's a lot of political grandstanding around the issue of US/Japan trade, on both sides. How much does that get in the way?

When US companies think the channels to the Japanese marketplace are closed, they get frustrated, especially when they have the common experience of trying different paths and not being able to get into the Japanese marketplace. So they naturally complain to their congressman or industry associations. Many congressmen are really anti-Japan. When I came to the States ten years ago, most people weren't even aware that Japan existed. But now they emotionally think that Japan is a threat, without thinking about reasons. In order to get votes from them, I think more congressmen are more provocative.

The major parties, both in Japan and the United States, are politicians. If they admit the other party's request, they lose in their district, even though they might think the other party is right. Therefore there is no incentive for the politicians of both countries to solve the problem.

I interviewed the companies in the middle, the venture companies and the congressmen and the government, and reached a hypothetical idea to solve those problems. The major reason US ventures complain to the congressmen is that they want to do business in Japan. They want to create a strategic alliance with Japan. They want to sell products in Japan. They want investors in Japan. If this can be done smoothly by infrastructures, their complaint is going to be alleviated—by eliminating all the inefficient ineffective intermediaries, by bringing the entrepreneurs to the Alliance conference and providing for them to meet real key decision-makers of the large Japanese corporations.

These key decision-makers are not usually easily identified by the US entrepreneurs. Because of the seniority society, title doesn't mean real power—lots of the presidents are figureheads. In the States, in a meeting between president and president, they make decisions. But if the US president meets a Japanese president, the Japanese president cannot make a decision. There are some US-type presidents, too, but not many.

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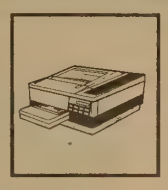

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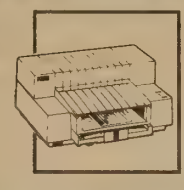

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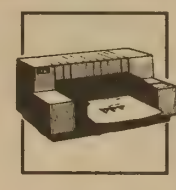

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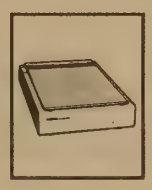

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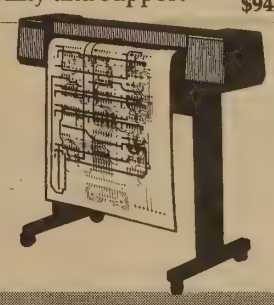

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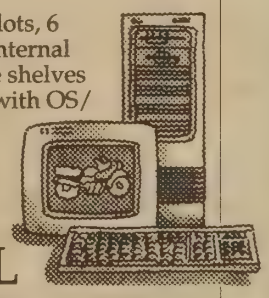

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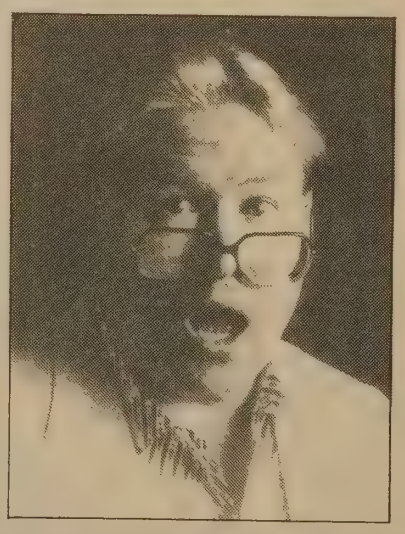

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makers, and the president of small and medium-sized companies to the conference, and provide the opportunity for both parties to talk about the possibility of creating strategic alliances. It eliminates lots of steps.

So by creating the new infrastructures to connect between US ventures and the Japanese companies, I think we can solve a lot of the potential problems that a US company may have in the future. In the past, the US and Japan had lots of conflicts in trade, such as a textile war, or steel or automobiles. But they say that in the 1990s and the next century the conflicts in the high technology field will be the most severe, because the country which has leadership in information science takes the lead in the world.

Since Russia is no longer the enemy, I am really worried that Japan will be labeled as a potential enemy. Next year is the 50th anniversary of Pearl Harbor, and many congressmen are really interested in that issue. The United States is a country which is composed of various nationalities, and Japan is so different at this point.

The people on the West Coast know many Japanese, and some have been to Japan, but still lots of American people who criticize Japan do not have any friends in Japan, and do not know anything about Japan, but still they have voting power and choose the politicians.

Japan has to position itself as a nation to contribute to the world. That is one reason I'm spending a lot of time helping development projects in Japan, because as long as Japan is labeled a closed nation, it's a very easy target to attack.

To change the politicians' mind is very difficult. But by creating thousands of strategic alliances between US business and Japanese business, and mixing the economic interests, entangling them—that's also another way to stabilize economic and political conditions. That is a grassroots-type activity, so it takes a longer time, but I believe it is much more effective than just creating treaties between US and Japanese governments that can be changed overnight.

In terms of politicians, both countries are capitalistic countries and business has a really strong power over the politicians. The chairmen of lots of fundraising committees are business people. If those people have a very strong interest in the opposite countries, they may prevent the politicians from saying extreme things.

There is no reflection of the Japanese end-user's voice here. For instance, the rice imports or citrus imports—most Japanese people, including myself, want imports of those products from the United States, and some food such as beef. The import quota from the States was enlarged a couple of years ago, and consumers really welcome such decisions. But because of the long tradition of relationships between Japanese industry and politicians, it's very difficult to change internally. Pressure from the US government on the Japanese government is supported by Japanese consumers and end-users. We are not as interested in protection as the Japanese government.

By combining the efficiency of every country, I think the world can be more prosperous, combining the strengths of each country. (DEFTA/Data Control Ltd., 415/873-6791; Fax 415/873-6794.) ■

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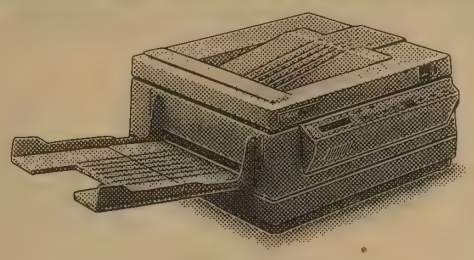

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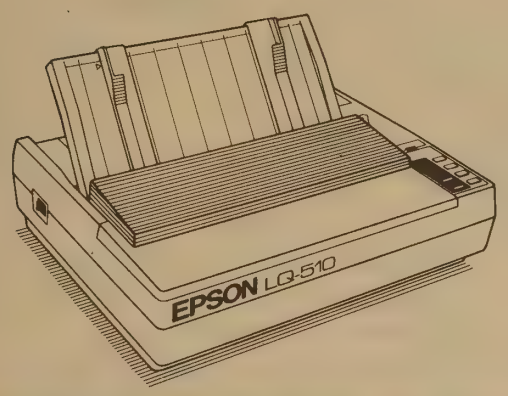

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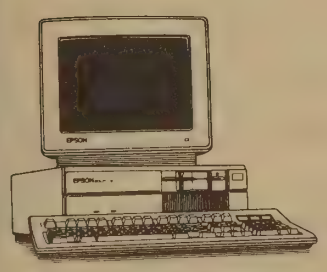

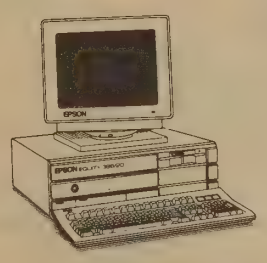

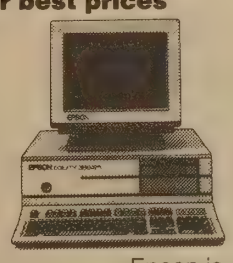

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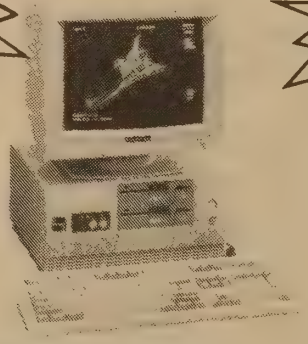

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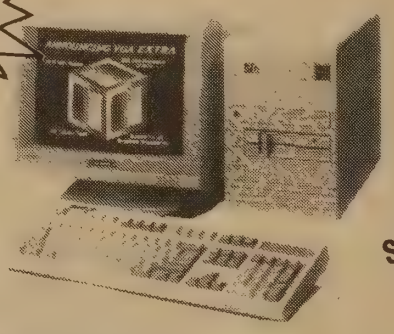

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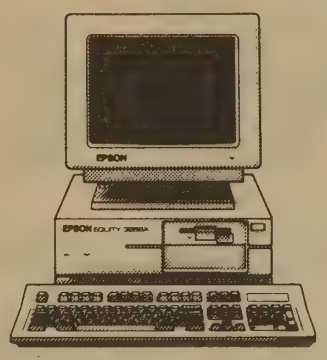

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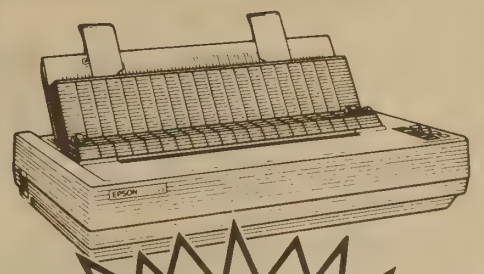

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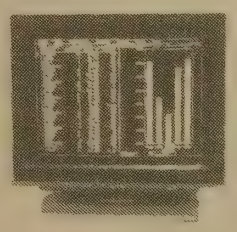

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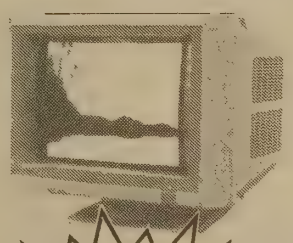

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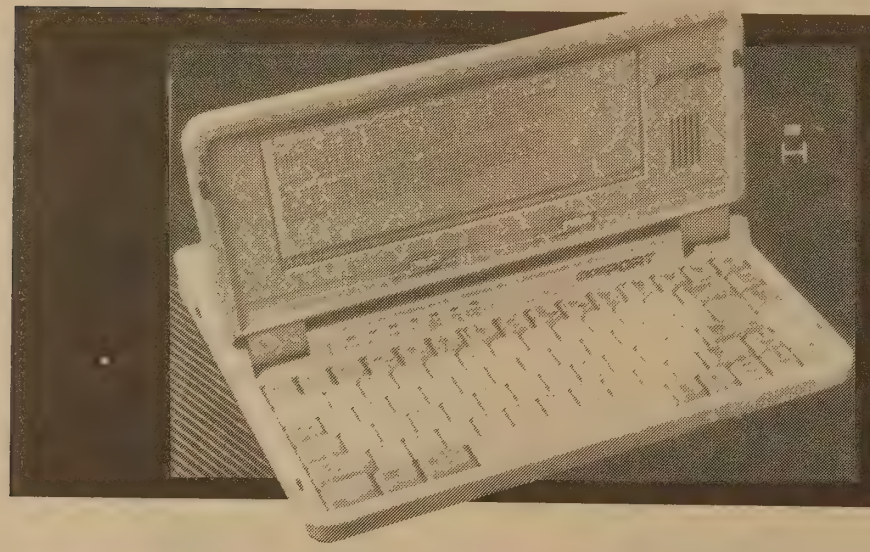
SPECIAL HANDS-ON REPORT:

The Zenith MinisPort

Leading a new generation of ultra-lightweight, powerful portables

BY ED KAHN

As laptops, once themselves a niche market, increase in popularity and miniaturization becomes even more dramatic, a new niche is developing in the portable computing marketplace: the notebook computer. Although therex have been really lightweight machines for years, there was usually some compromise either in capabilities or features. Now, however, a new generation of ultra-lightweight, powerful portables is upon us. New models are being announced almost weekly.



Little larger than a thick stack of paper, the MinisPort weighs under six pounds and offers a full 25 row by 80 column display.

Zenith was one of the first to release a high-powered notebook-size laptop. Their MinisPort is a completely redesigned machine incorporating innovative concepts. When I got this machine, I realized that this was not simply a tiny version of their larger laptops. Rather, Zenith had started from scratch. The result is a machine unlike anything else on the market. Little larger than a thick stack of paper, the MinisPort weighs under six pounds and offers a full 25 row by 80 column display. It is powered by an 80C88 running at 8MHz. It can be switched to the slower 4.77MHz speed if software requires it.

INNOVATION IN MEMORY AND STORAGE

The most innovative aspects of the MinisPort are in the use of memory and storage. The basic machine comes in either one or two megabyte configurations ($1,999 and $2,799). In either model, the memory above the basic 640K can be used as a "silicon disk." This is much like an old fashioned RAM disk, providing nearly instant access time. The difference between this memory and a RAM disk, however, is that an internal battery maintains this memory even when the machine is turned off. In effect, therefore, this memory functions much like an instantaneous hard disk.

The unit I tested had enough memory for me to create a silicon disk of about 1.39 Mb. Through the setup program that comes with the computer, you have the option of configuring this extra memory as either a silicon disk or as EMS expanded memory if you are running software like Lotus 1-2-3 that requires expanded memory.

WORKING WITH THE MINISPORT

When you turn on the machine it boots up to the C drive, which in reality is a ROM drive containing both DOS and Fast Lynx LX, a transfer program by which you can move files between the MinisPort and another IBM compatible computer. This is nearly the same as FastLynx ($149), a standalone program which you can install on any DOS-based computer to transfer files between two compatibles. The standalone version has the advantage of being able to copy files through either the serial or parallel port. Parallel transfers are much faster.

The advantage of the serial transfers, either on the Zenith machine or with the standalone version, is that you can clone the program onto a second computer. This means that if you have the program installed on your portable, you can transfer files to any other compatible computer through the serial cable that comes with the program. Many transfer programs require you to carry a disk in order to install the program on the other computer. With FastLynx, if the program is

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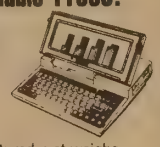

- Richly featured, yet weighs just 6.4 pounds
- Includes 512KB memory, expandable to 1.2MB
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- Runs on NiCad rechargeable battery pack or AC power for continuous operation

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- Just 5.9 pounds and fits in a briefcase
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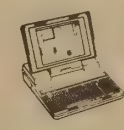
- 1MB memory expandable to 5MB, w/LIM/EMS

T/3200SX



- 16 MHz 80386SX CPU
- 2 Internal IBM Compatible expansion slots
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- 1MB memory expandable to 13MB
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- 1MB VGA compatible display system with high resolution gas plasma screen

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- 80386 CPU at 20 MHz: 80387 coprocessor
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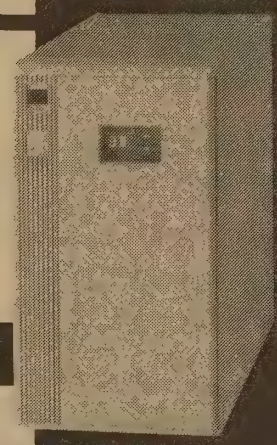

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- 1.2 Floppy
- 101 Enhanced Keyboard
- 1MB Memory
- 2 Serial ports, 1 Parallel port, 1 Game port

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286/16

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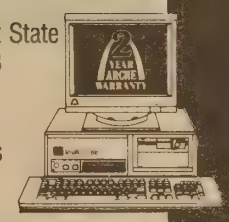

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Memory above the basic 640K can be used as a "silicon disk." An internal battery maintains this memory even when the machine is turned off. In effect, therefore, this memory functions much like an instantaneous hard disk.

on your computer you can follow onscreen instructions to transfer the program to a second machine. Once this transfer is accomplished, you can then copy files in a jiffy.

You can create an autoexec file in the silicon disk drive, so that when you turn the system on it will initialize the way you want. The computer boots up from the C drive, then searches the D drive for the autoexec file and then returns you to a C> prompt. In addition to the C and D drives, there is also drive A, a floppy drive. This, too, is a first, as Zenith has opted for a 2" 720K drive. The choice of this mini drive rather than the more conventional 3.5" drive saves both weight and size. These mini disks are a bit pricey, but Zenith does offer a starter kit ($139) which includes 10 disks, a cable to connect the MinisPort to another computer for Fast Lynx LX transfers, and a leatherette slip-case for the computer.

I found Zenith's unique design concept to work well with a number of applications I tested. I installed WordStar in the D drive and set it up to place data files on the A drive. I gave each project I worked on either a different subdirectory or a different disk. This meant that I could organize my material in the same way I do on my desktop machine.

A second application I tested required a modem. I installed the program on a 2" diskette and called it up directly from the A drive. It called on the modem and performed perfectly.

The computer comes with a serial port, but there is also an optional 1200 baud modem ($199) available. If you need a 2400 baud modem, you will have to use a standalone model that connects through the serial port. Although the 2" drive works well and saves space, Zenith has wisely provided a port for externally connecting a second disk drives, which will work as drive B. If, however, you do not have a second floppy drive, the built-in floppy drive will allow you to use it as both drives A and B. In file transfers and disk copying, the computer will prompt you to swap disks.

The 2" disks are convenient. You can buy a second 2" drive ($349) that works from the power supply of the MinisPort. If you prefer, a 720K 3.5" drive is available for $299. This one, too, gets its power directly from the MinisPort. A standard 360K 5.25" drive ($399) requiring its own power supply is available as a third option. Zenith has designed this machine to be extremely versatile.

Resources:

FastLynx ($149)
Rupp Corporation
835 Madison Ave.
New York, NY 10021
(212)517-7775

MinisPort Portable Computer ($1999)
Zenith Data Systems
1000 Milwaukee Ave.
Glenview, IL 60025
(800)553-0331

BATTERIES

The system works on a 10-ounce rechargeable nickel-cadmium battery pack. The AC adapter, included with the machine, lets you run the computer, charge the battery pack, or do both if the battery pack is in the computer while you are operating the machine on AC power. The battery system on the MinisPort is unique. In addition to the rechargeable/removable pack, there are a pair of lithium batteries that maintain memory when you are changing the battery pack. The lithium batteries will maintain the silicon drive for about three days without either the battery pack or AC power. Additional nickel-cadmium battery packs are available for $79. The life of a charge depends upon how you have set up your machine. Under the right conditions, a charge can give up to three hours of computer use.

A setup menu allows you to turn off almost all of the options that can use battery power and therefore reduce the life of a charge. Ports, backlighting, and even the disk drive can be turned off in order to extend the life of a charge. The setup program also allows you to set time and date for the built-in clock and choose a password to limit access to the computer.

KEYBOARD

The keyboard on the MinisPort is not much different in layout from that of many of the full-size laptops. It has an embedded numeric keypad, and an "Fn" key which, when used in combination with the Pad Lock key, makes a convenient block of letters into a numeric key pad. In this mode, these keys are just like a numeric pad in that when the shift key is pressed, the keys double as cursor control keys. For people who work intensively with numbers, this arrangement seems to be a fair tradeoff. But for those of us who are text oriented, it is a cumbersome arrangement at best. I always end up using the number keys across the top and the separate cursor control keys, even when I work with numbers.

The keyboard area has LED indicators to show when the numeric keypad is turned on. Lights also indicate the status of disk drives, scroll, caps, pad lock, and power. I never fully adjusted to this keyboard, either because of the feel or the fact that the keys do not travel the full length to which I am accustomed. It is possible that you may find the keyboard a delight. In any case, this is one of the two drawbacks I find with this unit.

DISPLAY

My other problem is with the LCD. Although it offers a full display and can be backlit, I find the characters too small for my comfort. The whole display measures only a little over 3" x 8." Even though I had trouble with the built-in display, I must praise Zenith for offering the option of connecting to an external monitor. A monitor stand ($49) is available.

If you use this machine for specific applications where size is really an important consideration, I think the tradeoff is worth it. There are also specialized word processors that allow you to increase the size of the text displayed. In any case, the LCD offers a clear crisp display—but a little small for my tired eyes.

Despite its size, this little unit packs a lot of power. I saw that it was possible to use this notebook-size computer for desktop-size tasks with little compromise. ■

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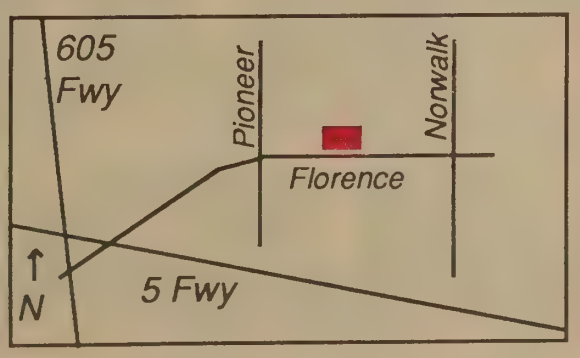

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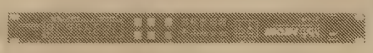

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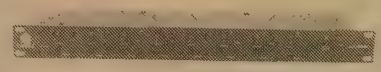

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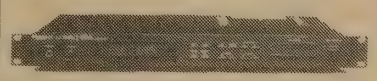

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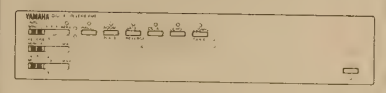

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continued from page 38

the 30 to 40 tps range. SQL Server running on a Compaq 386/33 PC performed at 8 to 12 tps, slightly better than the 5 to 10 tps performance of Sybase on a MicroVAX II, a low-end VAX minicomputer. This last result gives some credibility to the claim that PC local area networks have become a viable alternative to minicomputers for data processing applications.

All indications point to a continuing escalation of the benchmark wars over the next few years. Computer systems with multiple processors, tightly coupled servers, improvements in database caching techniques and other trends will continue to push the performance claims of the DBMS vendors higher. For example, Oracle has already claimed performance of up to a thousand transactions per second on an NCUBE, a massively parallel system that links up to 8192 processors in parallel.

In an attempt to bring more stability and meaning to the benchmark data, several vendors and database consultants have banded together to produce a standard relational database benchmark that would allow meaningful comparisons among various

INFORMIX SOFTWARE, INC.

Informix Software is a leading vendor of UNIX-based relational DBMS systems. The company's first relational DBMS, Informix, was implemented on UNIX-based microcomputer systems in the early 1980s, and was known for its efficiency and compactness compared to the VAX/VMS-based DBMS systems that were introduced about the same time.

In 1985 Informix was rewritten as a SQL-based DBMS and introduced as Informix-SQL. Informix-SQL has since been ported to several dozen different UNIX-based systems, ranging from UNIX-based PCs to Amdahl mainframes running UNIX. Informix has also been ported to personal computers under MS-DOS and to Digital's VMS operating system, but the majority of the company's sales remain in the UNIX market.

In addition to the Informix DBMS engine itself, the company offers Informix-4GL, a SQL-based fourth generation language that supports the development of forms-based interactive applications. The ACE report writer, another part of the Informix product line, supports the creation of different types of reports without programming. The programmatic interface to Informix-SQL is via embedded SQL, and a variety of host programming languages are supported. Informix-Turbo is a high-performance version of the Informix database engine, positioned to compete with OLTP versions of other vendors' DBMS products.

In 1988 Informix merged with Innovative Software, and added a line of PC-based office automation software to its product line. More recently, the company has shipped Wingz, a graphical spreadsheet for the Macintosh, with a future version of Wingz promised for IBM PCs under OS/2 as well. With these products, Informix is positioning itself as a full-line vendor of office automation products, all built on the underlying Informix database. To better support office automation applications, the company has announced its intention to add support for documents and other large objects to Informix. Informix Corporation's annual sales are currently in the $100 million range.

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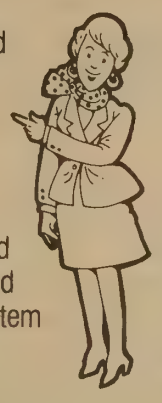

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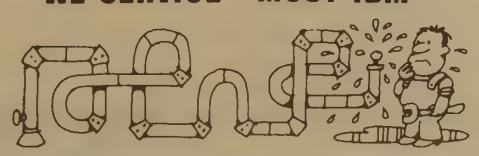

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DBMS products. To date, however, this group has had little real impact on database benchmarking.

Another phenomenon currently on the rise is the use of independent database consultants to "validate" benchmark data, providing an aura of independence and respectability to DBMS vendor claims. Unfortunately, the DBMS vendor usually pays the database consultant for this service, and many of the consultants earn substantial fees by consulting for the DBMS vendors, creating a built-in conflict of interest.

Despite vendor claims about OLTP performance, there are lingering doubts about the suitability of SQL for high-volume transaction processing applications. The best advice for prospective buyers of a SQL-based DBMS is to be skeptical of vendor benchmark claims and to ask questions about how the benchmark was performed, on what kind of hardware, and by whom. For real information about how a DBMS will perform in your application, the best data can be obtained by prototyping the application and benchmarking it on your own data. A discussion with another user who has implemented an appli-

INGRES CORPORATION

Ingres Corporation had its origins in the Ingres relational database prototype built at the University of California at Berkeley. During the early and middle 1980s, the Ingres DBMS and its QUEL database language were a major rival to SQL, and there was a particularly strong competitive rivalry between Ingres and Oracle in the midrange DBMS market. When SQL emerged as the standard database language, the company converted Ingres into a SQL-based DBMS. The product thus enjoys some of the advantages of being a more recent SQL implementation, along with the benefits of more than a decade of relational database experience.

Ingres was first implemented on Digital minicomputers, and the majority of the company's sales still come from the VAX hardware platform. Ingres has also been ported to several dozen different UNIX-based systems, and Ingres for PCs runs on DOS-based personal computers. A version of Ingres has also been introduced for IBM mainframes running VM/CMS. Using Ingres/Star, an Ingres installation on one system can remotely access Ingres databases on another system where Ingres is installed.

With its academic origins, Ingres has always had a reputation as a technology leader in the DBMS market. For example, its distributed database offerings have typically been available earlier, and with more comprehensive features, than those of its competitors. In the PC arena, the company squeezed its implementation of Ingres for PCs into a standard 640KB MS-DOS system, unlike the extended memory systems required by some of its competitors.

The company's business and development activity currently appears to be focused on two areas:

•Database engines, where the company is again trying to "lead the pack" in technology by adding object-oriented extensions and knowledge-based systems features to its SQL-based DBMS.

•Database tools, which are used as front-ends to the Ingres DBMS and have been licensed to others. The Ingres tools have been licensed to Digital for use as front-ends to Digital's own Rdb/VMS relational DBMS for VAX/VMS systems. Annual sales of Ingres are currently in the $100 million range.

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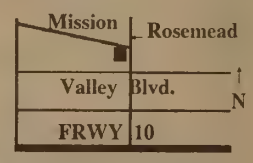

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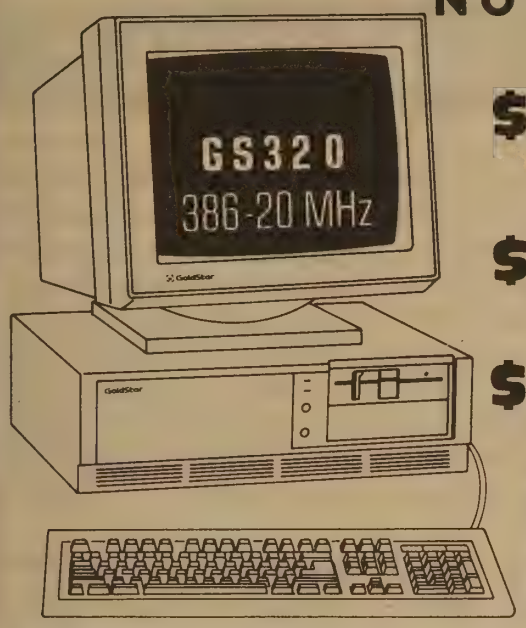

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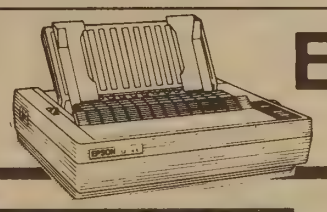

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cation similar to yours using the proposed DBMS can also provide useful information.

BUNDLED DBMS PRODUCTS

With the unveiling of its SAA strategy, IBM showed that it considers a relational database to be a strategic product that is logically an extension of a computer's operating system. The IBM product offerings support this point of view. DB2 operates as a subsystem of the MVS operating system on IBM mainframes, and the OS/400 operating system for the AS/400 midrange systems includes an integrated relational DBMS. With OS/2, IBM made the point even more explicit by combining a relational DBMS with key communications functions and calling the result OS/2 Extended Edition.

Other computer system vendors, independently and in response to IBM, have also concluded that relational databases are a strategic technology, and they now offer vendor-proprietary DBMS products for their systems:

•Digital Equipment Corporation has poured millions of dollars into the development of Rdb/VMS and VAX SQL, its relational DBMS products for the VAX/VMS family of systems.

•Hewlett-Packard has invested heavily in Allbase, a hybrid DBMS which supports HPSQL, a relational interface, and also provides backward compatibility with Image, a popular HP DBMS based on the network data model.

•Tandem has developed NonStop SQL, a

MICROSOFT CORPORATION

Microsoft is the largest vendor of personal computer software in the world, with annual revenues approaching one billion dollars. As the developer of MS-DOS, Microsoft Windows, and OS/2, the company is the leading supplier of personal computer systems software. It is also a major supplier of PC applications software, with a full line of products that include spreadsheets, word processors, graphics packages, project management programs, and computer languages (C, Pascal, BASIC, Assembler). Microsoft is also the largest supplier of applications software for Apple Computer's Macintosh personal computer.

Until 1987, Microsoft's product lineup did not include a database management system. With the announcement of OS/2 Extended Edition in 1987, IBM effectively extended its definition of a personal computer operating system to include an integrated DBMS and data communications. In 1988, Microsoft responded with SQL Server, a version of the Sybase DBMS ported to OS/2. Microsoft markets SQL Server as its OS/2 DBMS solution for its OEM customers, and Ashton-Tate has responsibility for retail distribution of SQL Server.

SQL Server is a product of Microsoft's system software division, which develops and markets Microsoft's operating systems products. Microsoft has announced that its application products, such as its Excel spreadsheet, will support SQL-based access to SQL Server over time. The company is also heavily recruiting other personal computer software developers to build front-ends to SQL Server.

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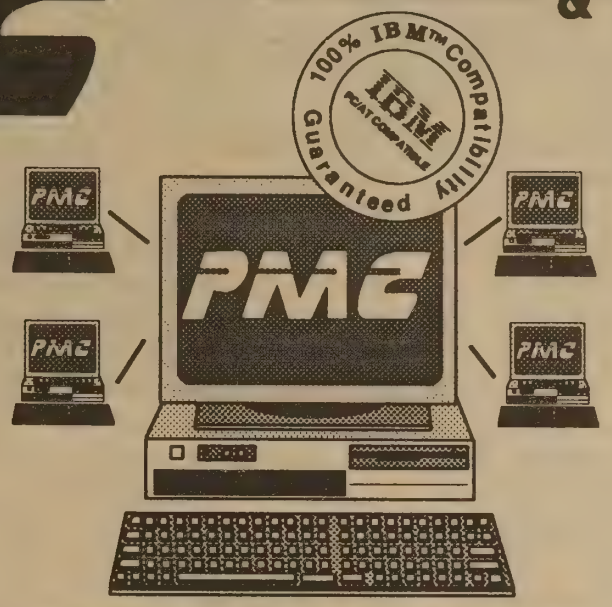

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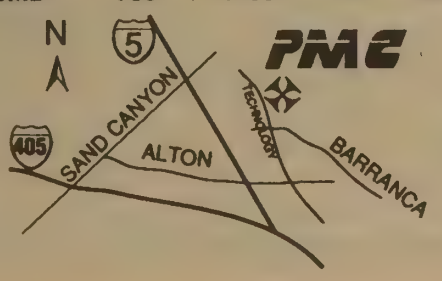

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relational DBMS that supports disk mirroring and other special features for its fault-tolerant family of OLTP systems.

•Data General offers DG/SQL, an implementation of SQL for its MV family of minicomputer systems.

Digital has taken the most aggressive stance of these computer vendors by bundling the Rdb/VMS run-time modules with every copy of the VAX/VMS operating system. This move has drawn sharp criticism from the independent DBMS vendors, who charge that Digital is using its clout as a hardware vendor to gain unfair competitive advantage for what they claim is a mediocre product. In fact, the independent DBMS vendors have continued to prosper on the VAX platform despite Digital's decision to bundle Rdb/VMS.

Digital's bundling move and IBM's packaging of SQL across its product line indicate the new importance that computer vendors are attaching to relational database technology and SQL. In the future, these vendors may further enhance the performance of their proprietary SQL products by building database support directly into their hardware and operating systems. In response, the independent DBMS vendors will continue to offer innovative new features, portability across multiple hardware platforms, and independence from any particular computer vendor. It thus seems likely that the symbiotic relationship between computer vendors and independent DBMS vendors which prevailed in the 1980s will be replaced by a growing conflict in the 1990s.

SQL STANDARDS

The adoption of an official ANSI/ISO SQL standard was one of the major factors that secured SQL's place as the standard relational database language in the 1980s. Compliance with the ANSI/ISO standard has become a checkoff item for evaluating DBMS products, so each DBMS vendor claims that its product is "compatible with" or "based on" the ANSI/ISO standard.

Despite these claims, no current SQL product is totally compatible with the ANSI/ISO standard, although many of the products are slowly moving toward compatibil-

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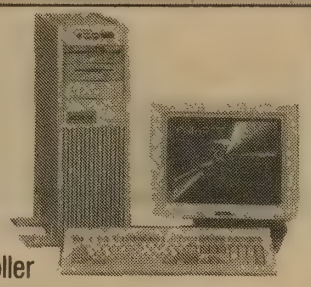

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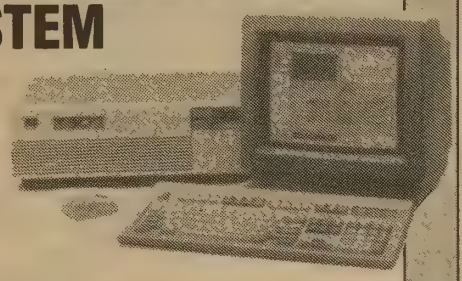

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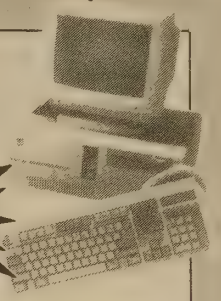

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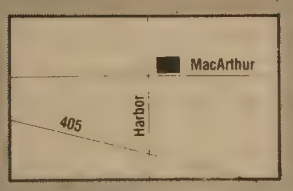

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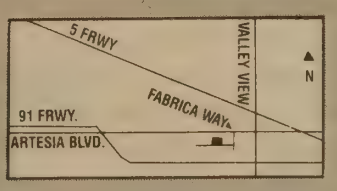

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ity. For example, the latest releases of DB2 and Oracle contain minor changes that were made for the sake of compliance with the standard. This trend should continue through the early 1990s, creating a slow convergence toward the ANSI/ISO standard.

The ANSI/ISO standard is relatively weak, with many omissions and areas that are left as implementation choices. For the past several years, the standards committee has been working on an expanded SQL2 standard that extends the SQL language. Unlike the first SQL standard, which specified features that were already available in most SQL products, the SQL2 standard is an attempt to lead rather than follow the market. It specifies features and functions that are not yet widely implemented in today's DBMS products, such as scroll cursors, standardized system catalogs, much broader use of subqueries, and a new error message scheme. It remains to be seen whether DBMS vendors will see more competitive advantage in adopting these new features or in continuing to extend SQL in their own proprietary directions.

In addition to the ANSI/ISO SQL standard, IBM's SAA SQL standard will be a powerful influence on SQL in the 1990s. As the developer of SQL and the largest DBMS software vendor in the world, IBM's SQL decisions have always had a major impact on other vendors of SQL products. When the IBM and ANSI SQL dialects have differed in the past, most independent DBMS vendors have chosen to follow the IBM standard. It is very

ORACLE CORPORATION

Oracle Corporation was the first DBMS vendor to offer a commercial SQL product, preceding IBM's own announcement by almost two years. During the 1980s, Oracle grew to become the largest independent DBMS vendor, with annual sales in the one billion dollar range. Today it is a major DBMS competitor, selling its products through an aggressive direct sales force and through reseller arrangements with several midrange computer manufacturers.

The Oracle DBMS was originally implemented on Digital minicomputers, and sales of Oracle on the VAX continue to pace the company's growth. However, one of the major advantages of Oracle is its portability. Oracle is currently implemented on nearly 100 different types of computer systems, giving it the broadest availability of any DBMS product. Oracle implementations are available for MS-DOS, OS/2, and the Macintosh in the personal computer market, for Sun, MIPS and many other UNIX-based workstations, for a very large variety of minicomputer systems, and for IBM mainframes. Using Oracle's SQL*Net networking software, many of these Oracle implementations can participate in a distributed network of Oracle systems, providing remote access from one system to another. The company has outlined a plan to provide full distributed DBMS capabilities in stages.

The Oracle DBMS was originally based on IBM's System/R prototype, and has remained generally compatible with IBM's SQL-based products. In recent years, Oracle has been aggressively marketing the OLTP performance of its DBMS, using benchmark results from multiprocessor systems to substantiate its claim as the OLTP performance leader. Oracle Version 6 includes a special transaction processing option for which the company charges a premium. The transaction processing option also includes PL/SQL, an extension of SQL with programming language statements which analysts generally consider a response to Sybase's Transact-SQL dialect.

Oracle Corporation has combined good technology with an aggressive salesforce and high-profile marketing campaigns. The company is attempting to exploit these advantages as it tries to extend its dominance into the personal computer arena with its OS/2-based products. In other attempts to enhance its competitive position, Oracle launched several new subsidiaries in the systems integration, manufacturing software, and financial software markets. Each subsidiary offers products and services based on the Oracle DBMS, but taps revenue opportunities that lie outside the DBMS market. The subsidiaries also contribute to the maintenance, support, and consulting revenue which has become an important part of the company's sales. Thus Oracle is positioning itself not just as a DBMS vendor, but as a major independent software vendor across a broad spectrum of systems.

SYBASE, INC.

Sybase is a mid-1980s DBMS startup company, funded by tens of millions of dollars in venture capital. The company's founding team and many of its early employees were alumni of other DBMS vendors, and for most of them, Sybase represented the second or third relational DBMS that they had built. Sybase positioned its product as "the relational DBMS for on-line applications" and stressed the technical and architectural features that distinguished it from other SQL-based DBMS products. These features included:

- A client/server architecture, with client software running on Sun and VAX workstations and IBM PCs and the server running on VAX/VMS or Sun systems
- A multi-threaded server that handled its own task management and input/output, for maximum efficiency
- A programmatic API, instead of the embedded SQL interface used by most other DBMS vendors
- Stored procedures, triggers, and a Transact-SQL dialect that extended SQL into a complete server programming language

Aggressive marketing and a first-class roster of venture capital backers gained Sybase the attention of industry analysts, but it was the subsequent OEM deal with Microsoft and Ashton-Tate that positioned the company as an up-and-coming DBMS vendor. Renamed SQL Server, the Sybase DBMS was ported to OS/2, and marketed by Microsoft to computer systems vendors (along with OS/2), and by Ashton-Tate through retail computer channels. In 1989, Lotus Development joined Microsoft and Ashton-Tate as Sybase investors. Although far afield from the initial Sybase focus on VAX-based OLTP applications, these events in the PC market boosted the prominence of Sybase.

The innovations in the Sybase product made it the most technically "flashy" DBMS in the late 1980s, and the company's late start gave it a technical competitive edge. By 1990, these innovations had provoked a competitive response from the other leading independent DBMS vendors, many of whom had announced plans for their own support of client/server architectures, procedural SQL dialects, stored procedures, triggers, and so on.

Sybase product development has tended to concentrate on the core features of the DBMS itself, with relatively less attention to the associated tools and utilities. The product line includes SQL Workbench, an application development and testing environment with a graphical user interface, but lacks the extensive set of forms packages, report writers, graphics packages, and other tools offered by some other DBMS vendors.

Sybase is a privately held company with revenues in the $50 million range.

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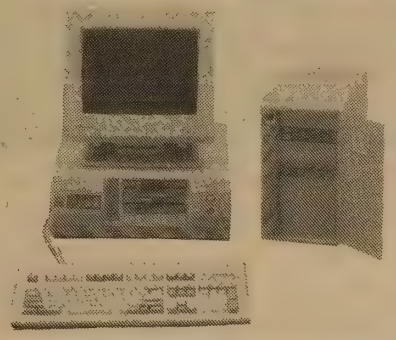

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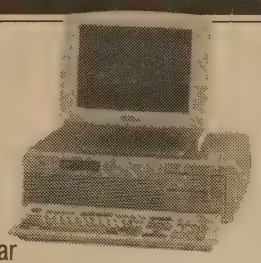

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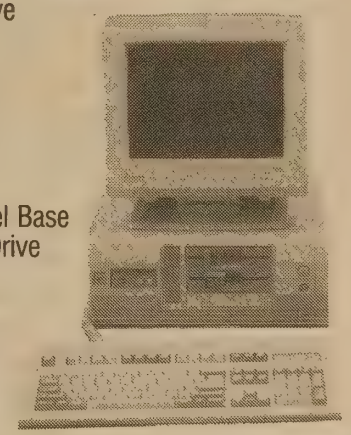

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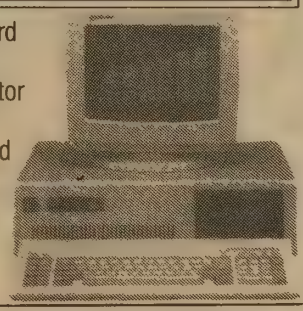

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likely that the same decision will be made in the future.

While the ANSI/ISO and IBM SAA standards focus on the SQL language itself, other groups have been working to standardize the application programming interface to SQL. The Remote Data Access (RDA) standard being developed by ISO falls into this category; it is an attempt to standardize database access across a network. The RDA work has progressed very slowly, with considerable redefinition of the proposed standard over the last few years.

In 1989 a group of database vendors, calling themselves the SQL Access Group, joined together to develop their own standard for a SQL applications program interface. Although the SQL Access Group included several of the most important DBMS vendors, both IBM and Sybase declined to participate, casting doubt on the widespread adoption of the SQL Access Group's recommendations.

In summary, the various SQL standards will continue to grow and evolve through the 1990s. The existence of several different standards, together with the introduction of new extensions and proprietary features from the DBMS vendors, ensures that there will not be a single, portable version of SQL in the near future.

Instead, the SQL standards will continue to be treated as guidelines and goals rather than rules. DBMS vendors will generally follow the IBM standard where there is one, and seek opportunities to differentiate their product in areas that IBM has not yet addressed.

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Tandem is the leading vendor of fault-tolerant computer systems. Many Tandem systems are sold to financial services and transportation companies for use in on-line transaction processing applications. The company's systems run the proprietary TXP operating system, and fault-tolerant applications are generally written in the proprietary Tandem Application Language (TAL). However, database management is provided by a SQL-based relational DBMS called NonStop SQL.

Because of Tandem's OLTP emphasis, NonStop SQL has pioneered several special techniques, such as disk mirroring, which are unique among SQL implementations. NonStop SQL also takes advantage of the Tandem multiprocessor architecture and provides distributed database capabilities. The programmatic interface to NonStop SQL is through embedded SQL.

SQL LANGUAGE EXTENSIONS

SQL is just over ten years old as a commercial product, and it is still actively growing and changing in its adolescence. DBMS vendors are investing heavily in SQL extensions and new features, including:

•Procedural statements. The addition of traditional programming language state-

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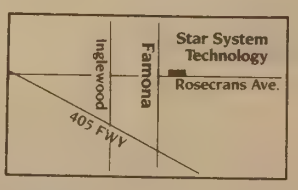

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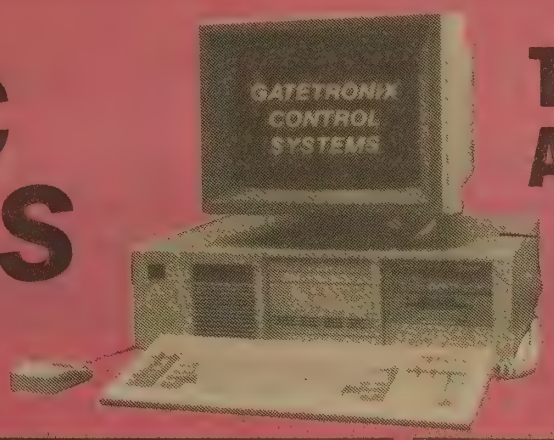

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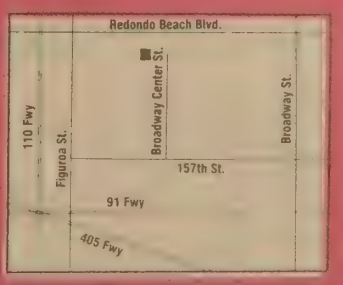

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ments (IF/THEN/ELSE, GOTO, FOR and WHILE loops, and so on) to SQL allows users to "glue together" SQL DML and DDL statements into complete SQL scripts. This capability is especially useful in a client/server architecture, because the server can execute an entire SQL script without statement-by-statement interaction with the requesting program, minimizing network traffic.

•Stored procedures. Stored procedures allow a sequence of SQL statements to be precompiled, named, and stored in the database for later execution. They combine the flexibility of dynamic SQL (the application program can decide which procedure to execute at run-time) with the performance of static SQL (the procedure code is precompiled, and the DBMS simply executes it at run-time).

•Triggers. Triggers allow a DBMS to automatically execute a SQL statement or statement sequence in response to an external event, such as an attempt to update, insert, or delete data in a table. With triggers, the DBMS can take a more active role in enforcing database integrity and business rules.

•Rules. Several DBMS vendors have begun to incorporate rules and other features borrowed from knowledge-based systems into their relational databases. Rules allow a database to encompass the "rules of thumb" and normal operating procedures of an organization, storing not only raw data but also knowledge about how an organization operates.

•Scroll cursors. Scroll cursors support the development of database browsing programs that allow a user to move freely forward and backward through a set of query results. This type of user interface can be very valuable in decision support and database query applications.

UNIFY CORPORATION

Unify Corporation is a supplier of UNIX-based relational DBMS products and database tools. In the mid-1980s Unify, Informix, Ingres, and Oracle were the four major UNIX-based DBMS competitors, with Oracle and Ingres battling for dominance as the "high-end" DBMS while Informix and Unify competed at the low end of the market. The Unify DBMS, since upgraded to become Unify 2000, is based on the network data model, with a SQL veneer for relational access. The embedded pointers and other features of the network data model give Unify excellent performance, but the lack of a true relational foundation has restricted the level of SQL support it can provide.

While the Unify DBMS remains an important part of the company's product line, over the last few years Unify's emphasis has shifted to database tools. The company's Accell application development environment is an advanced fourth-generation language designed to speed the development of interactive, forms-oriented data processing applications. Initially available only for use with the Unify DBMS, Accell now supports a range of SQL-based DBMS back-ends. It is an excellent example of a new class of "portable" database application development tools that have been adapted to work with a variety of SQL engines.

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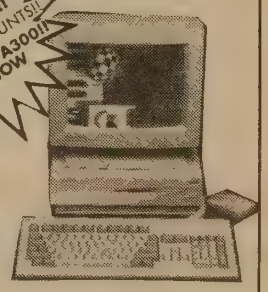

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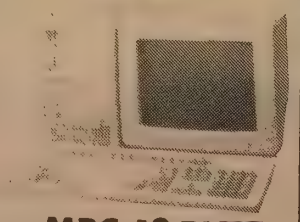

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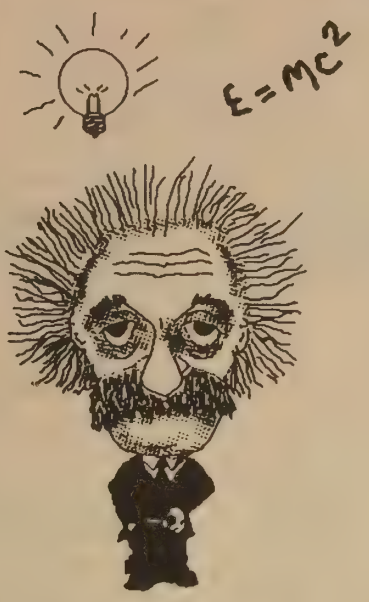

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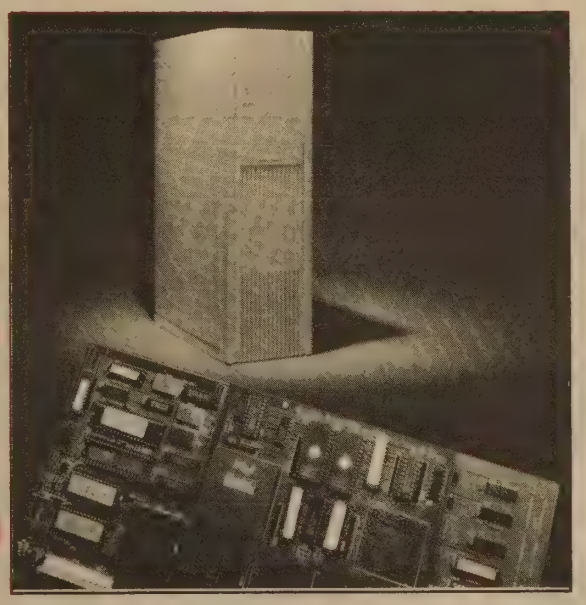

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The most active work on extending the SQL language is being done by the independent DBMS vendors, such as Sybase, Oracle, Ingres, and Informix. Sybase already supports procedural statements, stored procedures, and triggers in its Transact-SQL dialect. Ingres Version 6.3 added support for stored procedures and rules. Oracle supports procedural statements in the transaction processing option of Oracle Version 6, and it has announced referential integrity and stored procedure support for Oracle Version 7. Informix currently supports scroll cursors and offers Informix-4GL, a fourth generation language that combines SQL and procedural language statements.

In this area the 1990s are likely to continue the history of the 1980s, as each vendor introduces new SQL features that it hopes will provide a compelling reason for customers to purchase its DBMS products. The result is a continuous game of technical leapfrog, with each vendor forging ahead in certain areas while playing catch-up with its competitors in other areas. In the process, those features which the market deems important (procedural statements and stored procedures are the current favorites) will find their way into all of the products from leading independent DBMS vendors.

COMPLEX DATA TYPES

SQL was originally conceived and designed to handle typical data processing data such as integers, floating point and decimal numbers, and short character strings. As relational databases have become more popular, however, users want them to store and organize other types of data, such as scanned images, computer-aided-design drawings, spreadsheets, entire documents, and so on. Complex data types such as these are often referred to as binary large objects, or "blobs."

With the SQL language and DBMS technology of the 1980s, the only way to manage blobs was to store them in files, separate from the database. The database itself stored descriptive information about the object (such as a document's author, title, date, and keywords) and the name of the file where the object was stored. The applications program could then use SQL to search the database, but was forced to use conventional file input/output to process the blob itself. However, pressure has mounted to extend SQL and support blobs directly within the database.

At first it may seem straightforward to support a blob directly as a SQL data type, stored in a column of a relational table. However, the matter of blob support raises several serious issues for SQL and the relational model:

•Nonatomic data. The relational model assumes that each column in each row contains a single, atomic data item, but blobs often have parts and subparts and sub-subparts. This structure cannot be represented without violating the relational model.

•Random retrieval. If a blob contains a substructure, the applications program may want to retrieve individual parts of the blob (for example, sections of a document or layers of a circuit board layout) without retrieving all of the blob. SQL doesn't provide any mechanism for selecting and retrieving parts of a data item.

•Memory limitations. With conventional SQL, an applications program fetches an entire row of data into its buffers for processing. However, a large blob can easily exceed the available main memory of a personal

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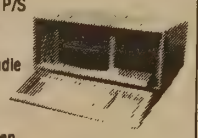

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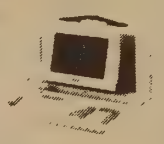

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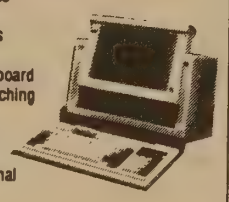

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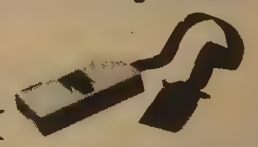

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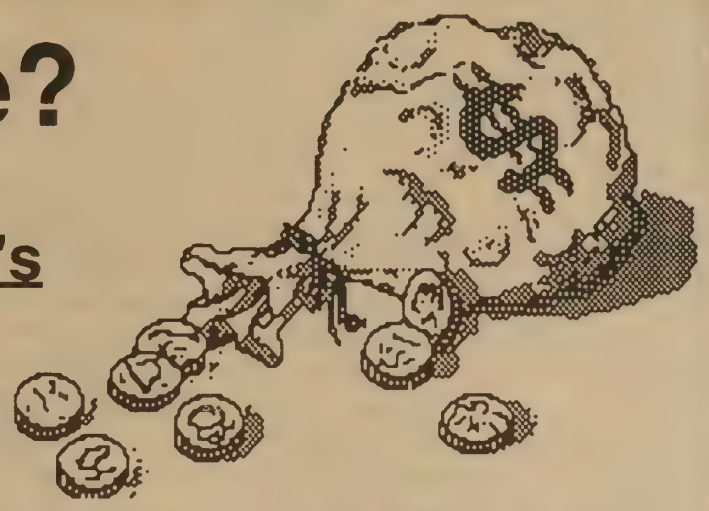

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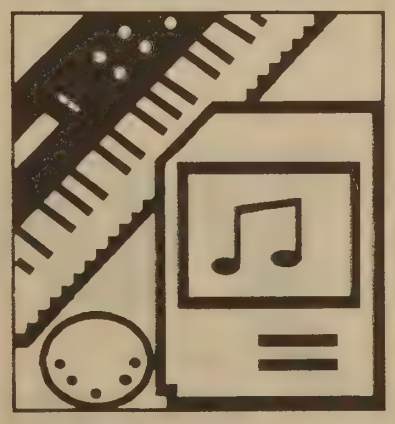

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computer. To process such blobs, a program must be able to store and retrieve them piece by piece, just as it processes data files.

•Searching. If a blob column contains text data, a user may want to select rows based on a full-text search of the contents of the blob. Other searches may be appropriate for other types of blobs. These nonstandard searches require extensions to the SQL language.

Despite these obstacles, support for blobs has become a hot issue, especially for DBMS products that run on personal computers and workstations that manipulate complex data objects. Informix, Ingres, and Sybase have all announced plans to support blobs in new versions of their DBMS products, and other DBMS vendors can be expected to follow. However, the development of techniques to store, retrieve, search, and process blobs is in its infancy and will continue to be an active area of SQL development and change well into the 1990s.

CLIENT/SERVER APPLICATIONS

The exploding popularity and aggressive pricing of personal computers has produced a major change in the way that organizations are implementing new data processing applications. Increasingly, application designers no longer assume a central minicomputer or mainframe communicating with dozens of users seated at "dumb" computer terminals. Instead, applications are migrating to personal computers, where they can take advantage of the PC's graphical user interface. The database that supports the application is stored on a database server, linked to the personal computers by a local area network. PC local area networks with OS/2-based database servers thus pose a serious competitive threat to minicomputers for new data processing applications.

This client/server approach to application design is accelerating the acceptance of relational databases, with the SQL language forming the interface between the personal computer and the database server. Some computer industry analysts, noting this phenomenon, have concluded that SQL database servers have become a commodity, and that the standardization of SQL will allow a SQL-based application to access data stored in any SQL-based database. Such pronouncements are at best premature, and probably off the mark. Performance and extended features are still major selling points for SQL-based DBMS servers, and major differences in SQL dialects make interchangeable front-end applications impossible to achieve with today's products.

SQL ACCESS FROM PC APPLICATIONS

The growing use of personal computers in corporate networks has generated intense interest in providing access to corporate databases from within desktop applications. PC users want to be able to use off-the-shelf PC-based tools to analyze and graph corporate data and incorporate it into their spreadsheets and word processing documents. DBMS vendors, PC software vendors, and personal computer vendors have all announced strategies and tools for providing this remote data access:

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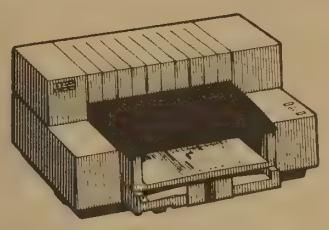

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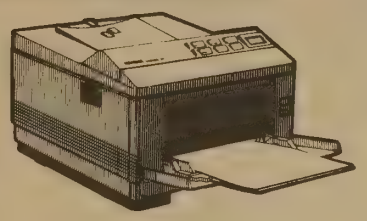

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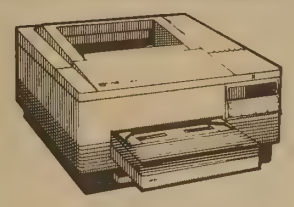

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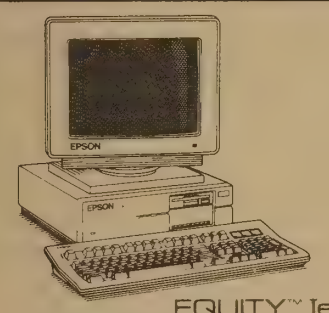

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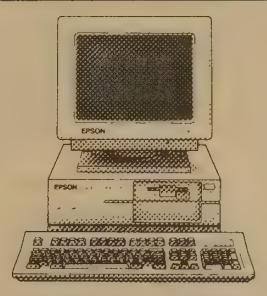

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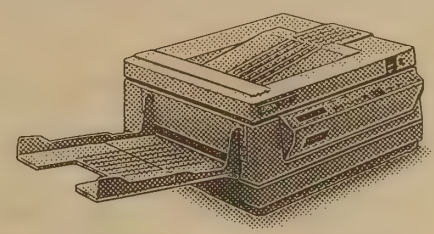

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dows, OS/2, and Macintosh), providing access both to PC versions of their DBMS and, via their networking capabilities, to their DBMS products running on multi-user systems. Each of these DBMS vendors is actively lobbying PC software vendors to support its interface.

•Lotus Development Corporation has announced its own data access interface, called Datalens, which is incorporated into Lotus 1-2-3 Release 3.0 and future Lotus products. Datalens allows a spreadsheet user to select, insert, and delete data from SQL-based databases for which Datalens drivers have been developed. Datalens drivers have been announced or demonstrated for Oracle, Novell's Netware SQL, Gupta's SQLBase and dBASE IV.

•Several PC application vendors have positioned their products as portable front-ends for access to SQL-based databases.

Paradox, DataEase, Advanced Revelation, dBASE IV and 1-2-3 have all been demonstrated as front-ends to multiple back-end servers, including SQL Server, OS/2 Extended Edition and Oracle Server. In each case, a separate database adapter generates the SQL dialect required by each supported server.

•Apple Computer has announced CL/1, a standard SQL-based connectivity language that links Macintosh applications to minicomputer and mainframe databases, including Oracle, Ingres, Sybase, Informix, Rdb/VMS, DB2, and SQL/DS. CL/1 masks the differences between these databases, allowing a Macintosh application to make standard CL/1 requests for remote data access, regardless of the brand of DBMS being accessed.

•Apple's HyperCard has also emerged as a standard front-end for remote database access on the Macintosh. Apple's own CL/1 product provides a HyperCard interface, and HyperCard is also supported as a database front-end by both Oracle and Sybase.

PC access to corporate data is a relatively new phenomenon and vendor strategies for providing that access are just beginning to solidify. The enthusiastic response to the early products from both PC users and data processing professionals indicates the importance of this phenomenon, and should dramatically expand the set of PC applications that support remote data access in the near future.

DATABASE TOOLS

The growing popularity of SQL-based DBMS products has produced a strong secondary market for database tools. These tools support the development, administration, and use of SQL-based databases, and include:

•application development tools, such as 4GLs, forms packages, and computer-aided software engineering (CASE) packages

•data access tools, such as graphical query interfaces, database browsing programs, and report writers

•database administration tools, including backup and recovery utilities and database performance monitors

•graphical user interface tools that support popular PC and workstation environments such as MS-Windows, OS/2, Open Look and Motif

Several DBMS vendors see the database tools market as a substantial business opportunity, either in addition to or in place of their

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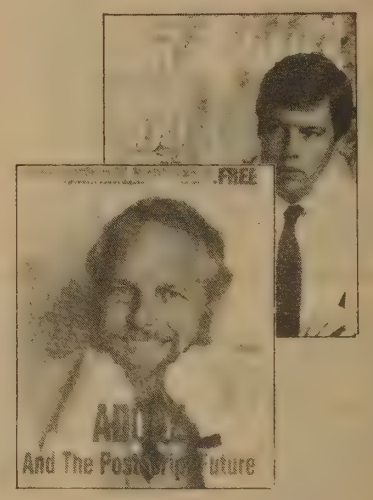

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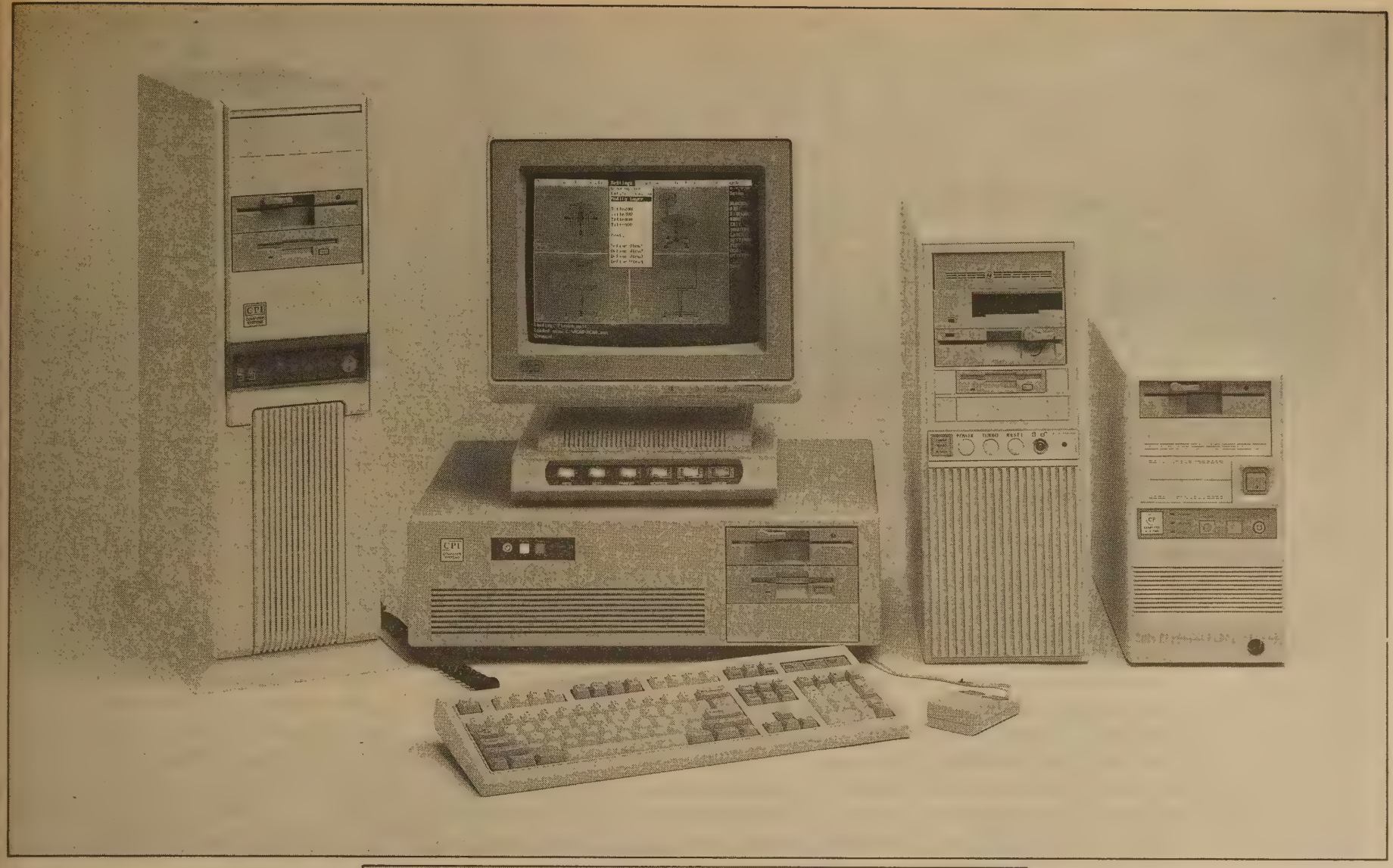

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core DBMS business. Ingres, for example, has signed an OEM agreement with Digital Equipment Corporation, under which Digital sells the Ingres database tools for use with its Rdb/VMS DBMS. Unify Corporation, a vendor of UNIX-based databases, has unbundled its Accell development environment and now offers it for use with other vendors' SQL-based databases.

In the PC arena, Ashton-Tate has positioned dBASE IV not only as a stand-alone DBMS, but also an application development tool and front-end for SQL Server. Gupta Technologies' SQLWindows provides a graphical user interface under MS-Windows, supporting Gupta's SQLBase and other SQL-based PC databases. Lotus Development Corporation, which began development of its own SQL database engine, has abandoned that strategy and repositioned its products as front-end tools for use with SQL Server and other SQL database engines. Over the next few years, database tools will emerge as a major application category in their own right, and the most popular database tools will provide support for a range of popular SQL-based database engines.

DISTRIBUTED DATABASES

Distributed database management is one of the most active areas of DBMS development today, and the steadily increasing support for distributed data will be one of the most important developments of the 1990s. DBMS vendors will unveil distributed database support in stages, and announcements driven by competitive pressures will typically precede actual product availability by six months or more.

For example, Oracle disclosed plans for two-phase commit protocols and location transparency in Oracle Version 7 in 1989, a full year before its availability. It will take until the mid-1990s or beyond until the ability to transparently update remote databases with full database integrity is a routine feature of SQL-based products.

Most DBMS vendors are primarily focused on providing distributed database capability among their own DBMS products, with secondary emphasis on gateways to other DBMS environments. Oracle, Ingres, and Rdb/VMS each provide gateways to the major IBM mainframe databases. Sybase also provides a DB2 gateway, and goes a step further with its Open Server specification, which allows third parties to build gateways to other DBMS environments.

Without any standards for distributed databases or the underlying protocols, gateways will continue to play a secondary role in the DBMS market. Distributed networks that mix different DBMS brands cannot provide the same kind of transparency and transaction integrity offered by a single-vendor network without such standards.

As in many other areas, IBM's actions could produce a dramatic change in distributed databases. To date, the protocols that IBM uses for internal communications among its distributed DBMS products are closed and proprietary to IBM. If IBM were to publish and standardize these protocols, however, independent DBMS vendors would rush to support them as a way of providing distributed access to DB2 and SQL/DS. The DBMS vendors could also use these IBM protocols as a "vendor-neutral" method of communicating among their DBMS systems, effectively providing a standard for implementing a heterogeneous distributed data-

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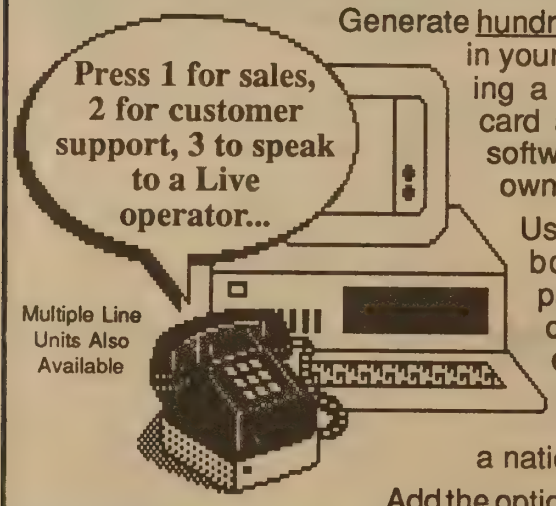

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base. Whether IBM will take such a dramatic step, or whether it will see a competitive advantage in having a closed, vendor-proprietary distributed DBMS, remains to be seen.

OBJECT-ORIENTED DATABASES

Much of the academic research in the database area over the past several years has been concentrated on new, "post-relational" data models. Just as the relational model provided clear-cut advantages over the earlier hierarchical and network models, the goal of this research is to develop new data models that will overcome some of the disadvantages of the relational model.

Today, most research on new data models is focused on so-called "object-oriented" databases. Enthusiastic supporters of object-oriented databases claim that they are the next generation of database systems and predict that they will mount a serious challenge to relational databases by the turn of the century.

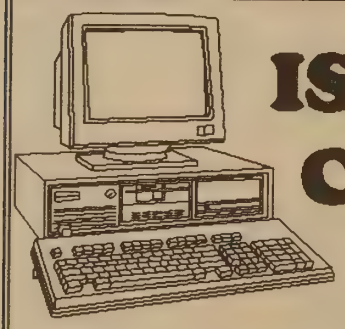
Unlike the relational data model, where Codd's 1970 paper provided a clear, mathematical definition of a relational database, there is no agreement on exactly what an object-oriented database is. When researchers use the term, they are generally describing a database that uses the same organizing principles as object-oriented programming. Those principles include:

•Objects. In an object-oriented database, everything is an object and is manipulated as an object. The tabular, row/column organization of a relational database is replaced by the notion of collections of objects. Generally, a collection of objects is itself an object and can be manipulated in the same way that other objects are manipulated.

•Classes. Object-oriented databases replace the relational notion of atomic data types with a hierarchical notion of classes and subclasses. For example, VEHICLES might be a class of object, and individual members ("instances") of that class would include a car, a bicycle, a train, or a boat. The vehicles class might include subclasses called CARS and BOATS, representing a more specialized form of vehicle. Similarly, the CARS class might include a subclass called CONVERTIBLES, and so on.

•Inheritance. Objects inherit characteristics from their class and from all of the higher-level classes to which they belong. For example, one of the characteristics of a vehicle might be "number of passengers." All members of the CARS, BOATS and CONVERTIBLES classes also have this attribute, because they are subclasses of VEHICLES. The

With the support of an official standard, the market clout of IBM, and the backing of several major independent DBMS vendors, the SQL bandwagon is simply too powerful to be derailed by a handful of object-oriented DBMS vendors any time in the near future.



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	MONO (720x350)	VGA (640x480)	VGA (1024x768)
486-25	$3995.00	$4200.00	$4450.00

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CARS class might also have the attribute "number of doors," and the CONVERTIBLES class would inherit this attribute. However, the BOATS class would not inherit the attribute.

•Messages and methods. Objects communicate with one another by sending and receiving messages. When it receives a message, an object responds by executing a method, a program stored within the object that determines how it processes the message. Thus an object includes a set of behaviors described by its methods. Usually an object shares many of the same methods with other objects in its class.

These principles and techniques make object-oriented databases well-suited to applications involving complex data types, such as computer-aided-design or compound documents that combine text, graphics, and spreadsheets. The database provides a natural way to represent the hierarchies that occur in complex data.

For example, an entire document can be represented as a single object, composed of smaller objects (sections), composed of still smaller objects (paragraphs, graphs, and so on). The class hierarchy allows the database to track the "type" of each object in the document (paragraphs, charts, illustrations, titles, footnotes, and so on). Finally, the message mechanism offers natural support for a graphical user interface. The applications program can send a "draw yourself" message to each part of the document, asking it to draw itself on the screen. If the user changes the shape of the window displaying the document, the application program can respond by sending a "resize yourself" message to each document part, and so on. Each object in the document bears responsibility for its own display, so new objects can easily be added to the document architecture.

There are several commercial object-oriented databases currently under development, but only a handful are available today as commercial products. However, object-oriented databases have already stirred up a storm of controversy in the database community. Proponents claim that object-oriented databases will eventually replace the relational data model. Critics claim that object-oriented databases are simply a rehash of the hierarchical databases of the 1960s, with new terminology and a new twist on old concepts. Relational database vendors claim that most, if not all, of the benefits of object-oriented databases can be achieved by adding blob support to a relational database.

Object-oriented databases will likely play an increasing role in specialized market segments, such as engineering design, compound document processing and graphical user interfaces. However, it is unlikely that they will have a major impact on mainstream data processing applications over the next few years. With the support of an official standard, the market clout of IBM, and the backing of several major independent DBMS vendors, the SQL bandwagon is simply too powerful to be derailed by a handful of object-oriented DBMS vendors any time in the near future. However, the same observation could have been made about the market potential of relational databases and SQL against the established DBMS leaders just a decade ago. Of all the trends in the database market, the development of object-oriented databases is the only one that threatens the continued dominance of SQL as the decade unfolds. ■

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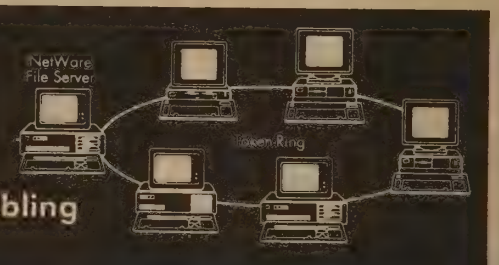

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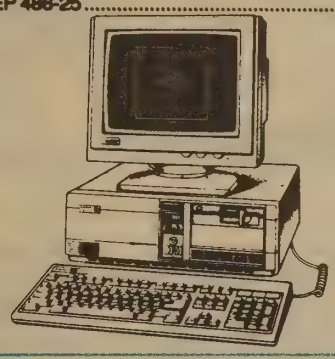

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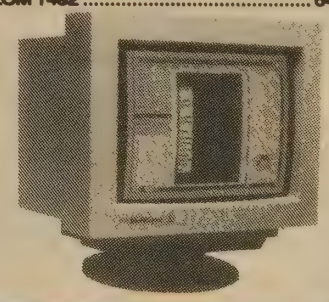

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	4MB BOARD	113634-001	$2,395	$ 595
DESKPRO 386/20,25	1MB MODULE	113131-001	$ 450	$ 164
	4MB MODULE	113132-001	$1,950	$ 485
DESKPRO 386/20E,25E	1MB MODULE	113131-001	$ 450	$ 139
	1MB BOARD	113644-001	$ 650	$ 240
	4MB MODULE	113132-001	$1,950	$ 465
	4MB BOARD	113645-001	$2,395	$ 595
DESKPRO 386/33	2MB MODULE	115144-001	$ 950	$ 299
DESKPRO 486/25, SYSTEM PRO	2MB MODULE	115144-001	$ 950	$ 299
	8MB MODULE	116561-001	$5,195	$2,282
PORTABLE 386	1MB KIT	107651-001	$ 650	$ 259
	4MB BOARD	107653-001	$2,395	$ 985
	4MB EXT BOARD	107654-001	$2,395	$ 985
PORTABLE III	512K KIT	107331-001	$ 269	$ 49
	2MB KIT	107332-001	$1,100	$ 325
PORTABLE LTE	512K BOARD	117077-001	$ 295	$ 197
	1MB BOARD	117081-001	$ 650	$ 239
	2MB BOARD	117081-002	$1,250	$ 385
SLT/286	1MB BOARD	110235-001	$ 650	$ 295
APPLE MAC				
PLUS,SE, SE30,II	1MB KIT	MO218	$ 250	$ 99
	2MB KIT	MO219	$ 450	$ 140
	4MB KIT	MO2707		$ 298
IIci	4MB KIT	MO292LL-A	$ 950	$ 296
	4MB MODULE			$ 546
	16MB KIT		$6,995	$2,685
IIcx	1MB KIT	MO218	$ 250	$ 76
	2MB KIT	MO219	$ 450	$ 140
	4MB KIT	MO2707		$ 288
	4MB MODULE			$ 546
IIfx	4MB KIT	MO376LL-A	$ 950	$ 548
	16MB KIT		$6,995	$2,685
PORTABLE	1MB KIT	MO248	$ 630	$ 434
	4MB MODULE			$2,999
LASERWRITER II/NTX	1MB EXP KIT	M6005	$ 450	$ 268
	4MB EXP KIT	M6006	$ 950	$ 536
AST RESEARCH				
BRAVO 286	128K KIT	500510-011	$ 50	$ 42
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BRAVO 386SX	512K KIT	500510-010	$ 135	$ 65
	2MB KIT	500510-002	$ 345	$ 174
PREMIUM 286 ADVANCED	1MB KIT	500510-007	$ 260	$ 118
	2MB KIT	500510-002	$ 345	$ 174
PREMIUM WS286/WS386SX	512K KIT	500510-010	$ 135	$ 65
	2MB KIT	500510-002	$ 345	$ 174
PREMIUM 386SX/16, 386/25	1MB MODULE	500718-001	$ 195	$ 103
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AST RESEARCH *Continued*				
PREMIUM 386/33	1MB MODULE	500718-002	$ 195	$ 139
	1-16MB EXP BOARD	500722-004		$ 562
PREMIUM 386/16,386C	1MB KIT	500510-007	$ 260	$ 125
	4MB KIT	500510-008	$ 675	$ 335
PREMIUM 486	2MB MODULE	500718-004	$ 850	$ 323
PREMIUM 486/25,25E, 25T,25TE, 33	1MB MODULE	500718-002	$ 195	$ 139
	1-16MB EXP BOARD	500722-004		$ 562
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6386,6386E	1MB UPGRADE	37714	$ 750	$ 199
	4MB UPGRADE	37716	$2,795	$ 550
6386/SX, 6386/25&33	2MB UPGRADE	37336	$1,195	$ 290
EPSON				
EQUITY IIc, 386/20	1MB KIT	A808091	$ 450	$ 192
	1MB KIT	A808231	$ 450	$ 222
	2MB KIT	A808101	$ 995	$ 321
386SX	1MB KIT	A808231	$ 450	$ 222
	2MB KIT	A808101	$ 995	$ 321
HP VECTRA SYSTEM				
VECTRA QS/16S	1MB KIT	D1540A	$ 595	$ 220
	2MB KIT	D1354A	$1,195	$ 295
	4MB KIT	D1542A	$2,495	$ 588
VECTRA ES/12PC	2MB KIT	D1354A	$1,195	$ 295
VECTRA QS/20S, RS/25PC	1MB KIT	D1640A	$ 595	$ 295
	4MB KIT	D1642A	$2,495	$ 583
VECTRA 486PC	2MB KIT	Two D2150A	$ 595	$ 325
	8MB KIT	Two D2151A	$2,495	$1,945
	16MB KIT			$3,993
HP LASER PRINTER				
LASER JET II,IID	0MB BOARD			$ 99
	1MB BOARD	H33443B	$ 485	$ 148
	2MB BOARD	H33444B	$ 775	$ 218
	4MB BOARD	H33445B	$1,450	$ 378
LASER JET IIP,III	0MB BOARD			$ 117
	1MB BOARD	H33474B	$ 485	$ 188
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	4MB BOARD	H33477B		$ 438
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POWER MATE 386SX	4-8MB EXP BRD		$2,295	$ 842
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T1600	2MB BOARD	PC8-PA8302U	$1,190	$ 280
T3100	2MB KIT		$1,190	$ 699
T3100E	512K KIT	PC9-PA8340U	$ 350	$ 178
	2MB KIT	PC9-PA8341U	$1,190	$ 286
T3100SX	2MB BOARD	PC15-PA8308U	$ 950	$ 419
	4MB BOARD			$1,088
T3200	2MB BOARD	PC6-PA7137U	$1,590	$ 492
T3200SX	2MB KIT	PC12-PA8307U	$ 990	$ 286
	4MB KIT			$ 950
T5100	2MB BOARD	PC7-PA8301U	$1,190	$ 280
T5200/T8500	2MB KIT	PC10-PA8304U	$ 950	$ 286
ZENITH				
Z248	2MB MODULE	Z805-1	$1,299	$ 389
Z386/20,25	1MB MODULE	ZA3600-ME	$ 899	$ 146
	2MB MODULE	ZA3600-MG	$1,299	$ 264
	4MB KIT	ZA3600-MK	$2,695	$ 684
SUPERSPORT 286	1MB KIT	ZA180-66		$ 368
	1MB BOARD			$ 288
	1MB EXP CARD	7PC-16AC		$ 215
	4MB KIT	ZA180-67		$1,119
SUPERSPORT 386SX	2MB BOARD	ZA180-86		$ 532
TURBOSPORT 386	1MB KIT	ZA3034-ME		$ 369

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	8MB BOARD		$6,500	$2,886
DATA GENERAL				
AVION SERIES	4MB BOARD		$3,000	$1,740
DEC				
DECStation 2100, DECStation 3100	4MB KIT	MS01-AA	$2,500	$ 899
VAXStation 3100, MicroVAX 3100	8MB BOARD	MS42-KA	$3,995	$1,567
	12MB ADD-ON	MS42-BA	$5,995	$2,197
	12MB EXP BRD		$5,995	$2,530
	16MB BOARD	MS42-CA	$7,950	$2,985
VT100 TERM. VT100 BOARD	1MB BOARD	VX10X-MA	$ 395	$ 315
	1MB MODULE	VX10X-MD	$ 395	$ 299
HP WORKSTATION				
HP-9000/200,300	2MB BOARD		$2,200	$1,080
	4MB BOARD		$3,000	$1,284
HP-9000/340	4MB BOARD		$3,500	$1,950
SILICON GRAPHICS (IRIS SERIES)				
PERSONAL 4D/20/25	4MB KIT	H4C04A	$1,650	$ 499
	16MB KIT	HU9C16B	$7,900	$2,643
PROFESSIONAL 4D/40/50/70/80 CS/12 TURBO12/16	4MB KIT	H4C04B	$1,650	$ 499
	16MB KIT	HU9C16B	$7,900	$2,643
POWER SERIES 4D/120/220/240/280	8MB KIT	H4C08X	$3,900	$1,906
SUN				
3/60,3/80,4/60, SPARC 1	4MB OPTION	X104C,-G,-H	$1,895	$ 625
4/110	16MB OPTION	X116D	$7,700	$2,386
SPARC 4/60, 4/330,4/370	16MB OPTION	X116H	$5,600	$2,783
4/330,4/370	8MB OPTION	X108E	$7,700	$1,237

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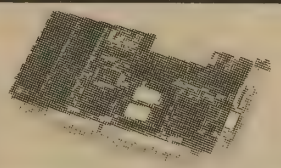

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- Supports up to 132 column text, up to 60 rows
- Automatically displays CGA, MDA and Hercules programs on analog monitors
- Runs under DOS, OS/2, Unix and Xenix
- Supports analog monitor and multifrequency monitors
- Drivers for Windows, AutoCAD, AutoShade, Lotus 1-2-3, GEM, Ventura Publisher and WordPerfect
- Popular software drivers

6400 16-BIT VGA (1024x768) 512K

- 800x600, 640x480 and 640x400 in 256 colors
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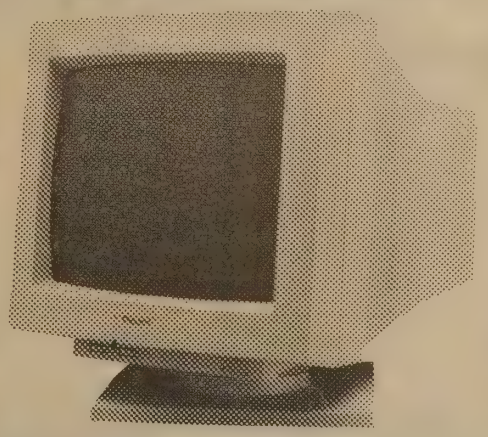

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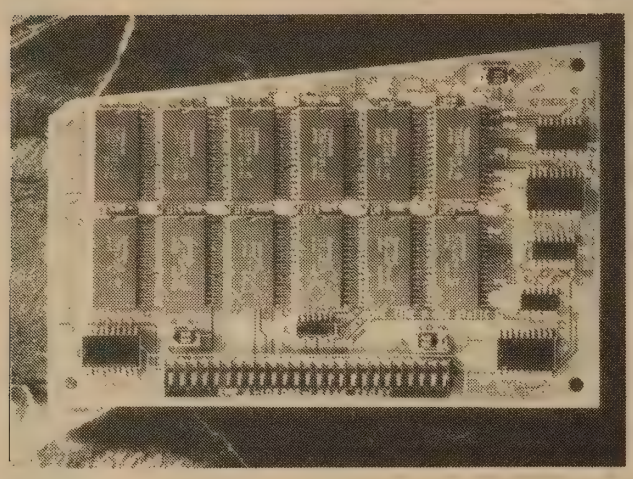
PRODUCT SPOTLIGHT

New Products

MACINTOSH

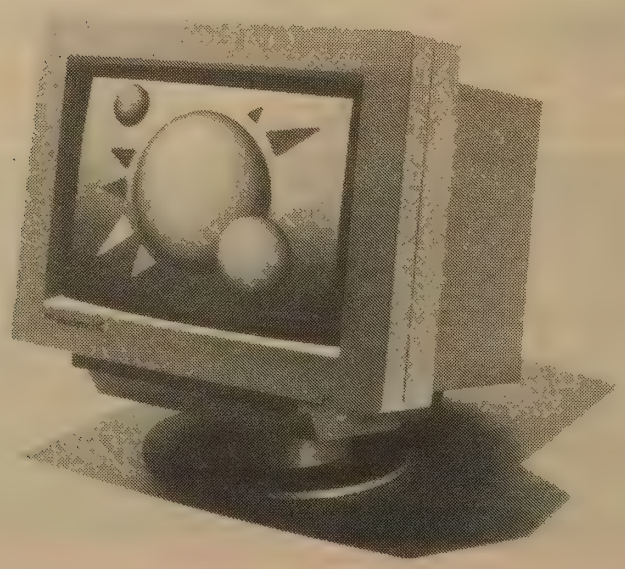
TRAVEL FURTHER WITH MORE MEMORY

Columbus Lifetime Memory, Inc., has introduced a 3Mb RAM board for the Macintosh portable. The board increases memory with no noticeable decrease in the life of the battery. Designed and manufactured to meet Apple's specifications, Columbus offers a lifetime guarantee against electronic failure to the original user. ($1495) Columbus Lifetime Memory, Inc., 305 Seventh St., Huntington Beach, CA 92648. 1-800-233-6233.



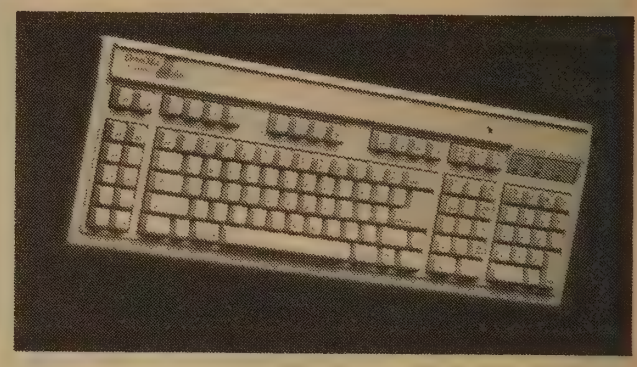
NEC MACSYNC COLOR MONITOR

NEC Technologies has designed a high-contrast color monitor to support the needs of Macintosh users. The 14" MacSync monitor has 640 x 480 resolution and enhances True Color 24-bit graphics images by displaying over 300,000 colors. Standard features include dark tinted CRT, an ergonomically designed cabinet, analog input, dedicated signal cable and a tilt/swivel base. ($699) NEC Technologies, Inc., 1255 Michael Dr., Wood Dale, IL 60191. (708)860-9500.



THE ULTRA KEYBOARD FOR MACINTOSH

The OmniMac/ULTRA, by Northgate Computer Systems, provides an alternative to Apple and Macintosh keyboards. Users experience increased typing speed and accuracy from the full stroke ALPS click/tactile mechanical key switches. The enhanced 119-key layout features Apple-style legends and two sets of functions keys. For added convenience, OmniMac ULTRA has a separate numeric keypad to speed calculations and keep cursor control keys free. Northgate offers a sixty-day no-risk trial period and a five year warranty on all OmniKey and OmniMac keyboards made with click/



PRODUCT UPDATES

➤ **Apple Computer** has released **Hypercard 2.0**. The upgrade has more than one hundred new features, including variable card size, multiple windows and improved text styles. Contact: Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014. (408)996-1010.

➤ **Lotus** announced an enhanced edition of its **1-2-3 Release 2.2** spreadsheet for the government market. The new version includes the requested file translation capability between Multiplan 4.0, Enable 2.0, SuperCalc 4.0 and Lotus 1-2-3. Contact: Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142. (617)577-8506.

➤ **Solutions, Inc.** has begun shipment of **Faxgate Plus v1.1**, which includes support for users of QuickMail from CE Software. Solutions also offers an introductory five-user pack of MailMaker workstation software with each purchase of Faxgate Plus. Contact: Solutions Inc., 30 Commerce St., PO Box 783, Williston, VT 05495. (802)865-9220.

➤ **Sysgen, Inc.** announced Release 1.4 of its **MaxiBack** software for Novell ELS and Advanced NetWare operating systems. The new release adds the capability to backup files located on a hard disk anywhere on the network. Contact: Sysgen, Inc., 556 Gibraltar, Milpitas, CA 95035.

➤ **WordPerfect Corp.** has released **PlanPerfect 5.1**, an upgrade which provides compatibility between PlanPerfect and WordPerfect 5.1. The update for PlanPerfect 5.0 users costs $39, for MathPlan users the update is $75. Contact: WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057. (801)222-5008.

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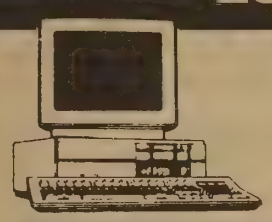

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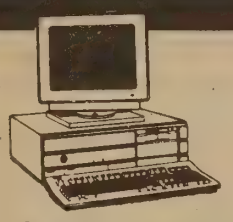

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4 Meg Upgrade For Laser Jet III	499
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tactile key switches. ($159) Northgate Computer Systems, Inc., PO Box 41000, Plymouth, MN 55441. 1-800-548-1993.

LAPIS LINKS MAC SE AND TV

The DisplayServer SE from Lapis Technologies, Inc. now comes with a near-NTSC TV output. This will make it possible to display flicker-free Mac SE output on a regular TV screen, over closed circuit TV, or to record the signal on a VCR. The television is a separate output board that installs in the Mac SE with the DisplayServer SE video board. A standard RCA jack on the output board provides composite black-and-white video for display on NYSC media. ($79.95) Lapis Technologies, Inc., 1210 Marina Village Pkwy., Alameda, CA 94501.

PRODUCT UPDATES

Microsoft Windows 3.0

➤ The enhanced Windows 3.0 version of **PageMaker** for the PC has been announced by **Aldus Corp.** Registered owners of PageMaker 3.0 for the PC can purchase the update for $25. For subscribers to Aldus's CustomerFirst and Extended Technical Support Service programs, as well as customers who purchased PageMaker after May 22, the update is free. Contact: Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (206)628-6594.

➤ A new **"Notify"** feature for **cc:Mail LAN** packages marks cc:Mail support for Windows 3.0. This will enable users to receive instant notification of new cc:Mail messages within their Windows desktop. This is available as a free upgrade to all registered cc:Mail users. Contact: cc:Mail, Inc., 2141 Landings Dr., Bldg. T, Mountain View, CA 94043. (415)961-8800.

➤ **Informix Software** has upgraded **Wingz** for use with Windows 3.0 and OS/2 Presentation Manager. Version 1.1 for Windows 3.0 and PS/2 PM is file compatible with v1.1 of Wingz for the Macintosh and for NextStep. Contact: Informix Software, Inc., 4100 Bohannon Dr., Menlo Park, CA 94025. (415)926-6300.

➤ The **Above Board** memory boards, **Math CoProcessors**, **Connection CoProcessor** fax boards and the **Inboard 386** accelerator board from **Intel's PCEO** support Windows 3.0. Contact: Intel Corp., Personal Computer Enhancement Operation, CO3-7, 520 NE Elam Young Pkwy., Hillsboro, OR 97124. 1-800-538-3373.

➤ **Tandon Corp.** will offer Windows 3.0 with its complete line of desktop and laptop personal computers. Contact: Tandon Corp., 301 Science Dr., Moorpark, CA 93021. (805)523-0340.

➤ **Zenith Data Systems** is now factory-installing **Windows 3.0** on all hard disk drives of its 286- and 386-based computers. Contact: Zenith Data Systems Corp., 1501 Feehanville Dr., Mount Prospect, IL 60056. 1-800-553-0331.

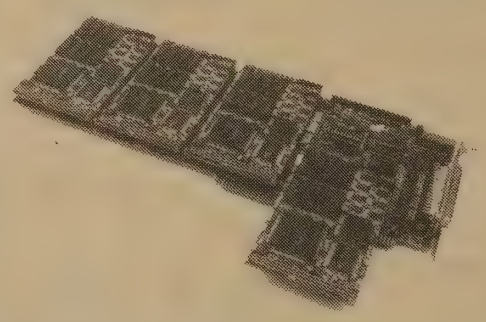
LOCAL AREA NETWORKS

ARCNETPLUS—THE NEXT GENERATIONS

In 1977 Datapoint Corp. introduced ARCNET, the Attached Resource Computer network, bringing a new concept of computing to the marketplace: distributed data processing (DDP). DDP, in turn, became the architecture model from which the client/server application architecture of the 1990s has evolved. ARCNETplus represents the second generation in local area networks—and the first multi-bit rate LAN. Building on Datapoint's experience, ARCNETplus offers operation rates eight times faster than earlier ARCNET versions, streamlined packet overhead, variability in packet sizes to optimize both transaction processing applications and rapid bulk-data transfers, and support for as many as 2,047 nodes per network segment. Datapoint Corp., 9725 Datapoint Dr., San Antonio, TX 78229. 1-800-733-1500.

EGNA MAKES THE UNTERMINAL MORE GRAPHIC

The Enhanced Graphics Network Adapter (EGNA), by Advance Micro Research, Inc., is a multiuser color graphics display adapter that introduces fast color text and bit map



graphics to 386- and 486-based multiuser PC systems. The multiuser graphics display adapter replaces Intelligent I/O and slow ASCII text-based dumb terminals. Under operating systems such as XENIX, UNIX and Multiuser-DOS, EGNA connects multiple standard EGA monitors and PC/AT keyboards as UnTerminal remote user stations. In a multiuser environment, each EGNA UnTerminal user experiences a true standalone PC feel and all of the unlimited display capabilities of the system's main console. ($849) Advance Micro Research, Inc., 2045 Corporate Ct., San Jose, CA 95130. (415)456-9400.

PLUG-AND-PRINT SERVER FROM INTEL'S PCEO

NetPort, from Intel's Personal Computer Enhancement Operation (PCEO), is a compact printer server for Novell networks. Unlike the traditional method of connecting printers to file servers, the NetPort print server lets users locate printers anywhere along the network. And unlike dedicated PC print servers, it eliminates the need for a dedicated PC host, reducing network security risks and simplifying installation, while increasing user productivity. ($695) Intel Corp., Personal Computer Enhancement Operation, CO3-7, 5200 NE Elam Young Pkwy., Hillsboro, OR 97124. 1-800-538-3373.

FUJITSU'S STOREDGE OFFERS A GIGA-EDGE

To meet the growing demand for maximum reliability and high capacity data storage solutions on today's LANs, Fujitsu America, Inc. introduced a data storage subsystem with more than 2Gb of online storage capacity. Fujitsu's StorEdge is designed for compatibility with Novell NetWare 386, and is certified for NetWare 286 and NetWare SFT. StorEdge offers flexibility by providing both online storage and tape backup. The subsystem can be configured with any combination of up to three Fujitsu 778Mb or 380Mb 5.25" disk drives, and 0.5" cartridge tape drives. The new Fujitsu 778Mb 5.25" drives carry the industry's highest reliability rating of an expected 200,000-hour mean-time between failure. In addition, StorEdge is the only storage subsystem that comes with a free, one-year on-site service warranty. (Suggested retail price starts at $4300) Fujitsu America, Inc., 3055 Orchard Dr., San Jose, CA 95134. (408)432-1300.

NOVELL'S WORKPLACE FOR THE MACINTOSH

Novell, Inc., has introduced a new version of its LAN WorkPlace for Macintosh networking software, giving Macintosh computers full access to host computers, peripherals and services on business-wide TCP/IP networks and reinforcing Novell's commitment to heterogeneous connectivity. LAN WorkPlace for Macintosh supports Macintosh user interface standards to access a full range of TCP/IP network services, exchanging information with systems such as VAX minicomputers and UNIX-based workstations, while supporting multiple sessions with other computers and NetWare servers. ($250) Novell, Inc., 122 East 1700 South, Provo, UT 84606. 1-800-453-1267.

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7D Tower Case
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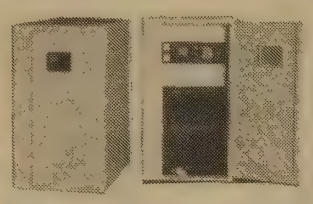

5D Tower Case
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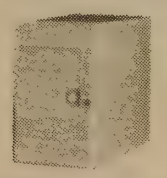

3D Tower Case
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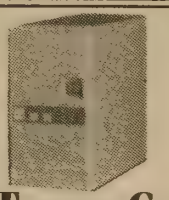

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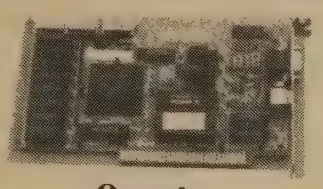

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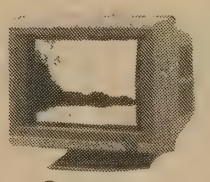

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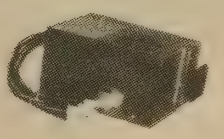

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200W Full AT $37

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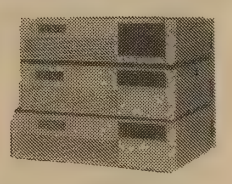

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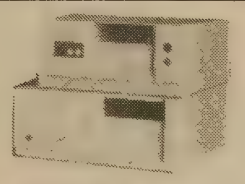
Baby AT Case $34
Full Size AT Case $38



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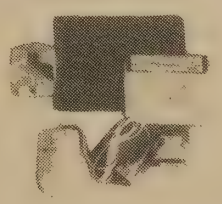
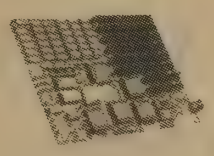


Q+ Mouse . $22

Trackball . . $34



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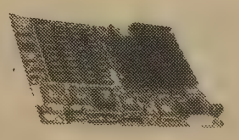
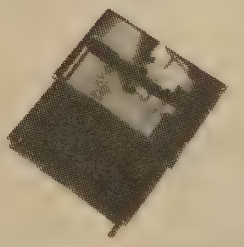


386 SX OK Motherboard $305

IDE FD/HD Controller $18



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The Open Mailbag

BY MATTHEW LEEDS

The last few months I've been busy covering new Commodore hardware. As a result, the pile of software awaiting review has gotten out of hand. This month I'll get caught up.

TV*SHOW

TV*Show from the Zuma Group has been updated to Version 2. This new version adds support for the ANIM format and 8SVX sound files. There is also support for most any IFF image, including HAM, EHB, and overscan. The manual is now much larger, and is spiral bound for easy reference. TV*Show is the companion product to TV*Text Professional.

AMIGA

THE ART DEPARTMENT

ASDG has shipped The Art Department, a new full-featured, 8- and 24-bit image processing software system. In addition to its long list of special effects, The Art Department can create magazine-quality color separations from virtually any image data source with up to 24 bitplanes (16,777,216 colors). Also useful for color desktop publishing and layout, The Art Department produces 12- and 24-bit color separations compatible with ASDG's ReSEP and Gold Disk's Professional Page desktop publishing software.

The Art Department is also of special interest to graphic and video artists who use Amiga 3D modeling software, since it converts 24-bit images to Amiga-displayable images faster than otherwise possible with any of the 3D rendering packages currently on the market.

The Art Department uses a modular file loading interface and comes with two file loading modules: a DigiView 21-bit loader and a Super-IFF loader, supporting any IFF format image with up to 24 bitplanes. Formats supported by the Super-IFF loader include: EHB, HAM, AHAM, SHAM, Dynamic HAM, ARES, and Dynamic HIRES file formats. In addition to those file formats currently available, ASDG plans to release loaders for other formats.

The Art Department also gives you extremely powerful palette control, including palette editing, lock in, and the ability to load and save palette combinations. Powerful color map controls are also provided, along with brightness, contrast, and fully variable Gamma correction. The size of images is limited only by your system's memory.

Other features include 208 Amiga rendering/video modes, six methods of dithering, an automated image "touch-up" mode, and a unique facility that uses proprietary edge-detection technology to create line art from any image.

TEMPLICITY

The Sterling Connection has released Templicity, a set of 104 spreadsheet templates for business and personal needs. These templates cover personal finance, home office, real estate, advertising, sales, inventory, taxes, budgets, and other categories of interest to small business. Versions of Templicity are available for Analyze!, MaxiPlan, SuperPlan, and VIP Professional.

BGRAPHICS

Brown Wagh has shipped BGraphics, a professional business graphics package, designed to generate charts, graphs, and diagrams for screen or printer output. Numeric information can be input directly or imported from spreadsheets. Over 20 different types of charts are provided, with 2D and 3D perspectives. There is full support for IFF graphics, including the use of brushes as columns. BGraphics is quick, easy to use, and produces good-looking results.

DISTANT SUNS

Virtual Reality Laboratories has released Distant Suns, an upgraded and improved version of Galileo, the planetarium simulation. Distant Suns includes a database of over 2,200 stars, with optional data disks that include 20,000 stars from the NASA Sky catalog or 9,100 stars from the Yale Bright Star cata-

The Outline Fonts package provides you with the capability to create professional-looking fonts in any size for use with any Amiga program. This is akin to buying the cow instead of the milk, always a good idea.

Copyright © 1990. All rights reserved. *Matthew Leeds has been involved in the high tech field since he blew up his bedroom playing with a children's chemistry kit. He has been using Commodore computers since 1982 and has a strong interest in photography, video, graphics, and related fields.*

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Amiga 2000 System	$3152	$1599
A2000 CPU (1MB RAM, 3.5" disk-drive, 9 internal expansion slots), 2nd internal 3.5" drive, A2088D board for PC/XT compatibility, 1084S color monitor.		
Amiga 2000HD System	$4697	$2579
A2000HD CPU (1MB RAM, 40 meg hard drive, 3.5" disk drive, 9 internal expansion slots), A2286D board for PC/AT compatibility, 1084S color monitor.		
Amiga 2500/30 System	$6697	$3679
A2500 CPU (68030/68882, 3MB RAM, 40 meg hard disk), A2286D board for PC/AT compatibility, 1084S color monitor.		
Amiga 3000/25-40 System	$4798	$3039
A3000 CPU (68030/68882@25MHz, AmigaDOS 2.0, 2MB RAM, 40meg hard disk), A1950 multiscan color monitor.		

All systems include *AmigaVision*, the new interactive icon-based authoring system for multimedia presentations and instructional courseware.

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4096 color paint program with fantastic special effects and tools!

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HARDWARE SPECIALS

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Give your A2000 computer mini-computer performance at a microcomputer price. Up to 30MHz, includes 68882. **Call for prices.**

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Lightning fast SCSI host adapter for the Amiga 2000/2500 computers. 3.5" hard drive can be mounted directly on the card. **Sharp JX-100 Color Scanner** $789
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log. A digitized images disk of over 200 deep sky objects is also available. If you have even the slightest interest in astronomy, space, or the constellations, you owe it to yourself to buy a copy of Distant Suns. It's far more than just an educational program, it's fun to use.

OUTLINE FONTS

Gold Disk has shipped Outline Fonts, a set of 35 Compugraphic fonts and utilities for creating Amiga bitmapped, Professional Draw outline, and PostScript downloadable versions. The 35 fonts correspond to the fonts found in most PostScript compatible printers. The Outline Fonts package provides you with the capability to create professional-looking fonts in any size for use with any Amiga program. This is akin to buying the cow instead of the milk, always a good idea.

JUMPDISK

Disk-based magazines come, and disk-based magazines go, but one disk magazine for the Amiga remains. Jumpdisk has been providing subscribers with quality programs, news, tutorials, music, art, and an ever-evolving level of sophistication for four years. That's longer than many paper-based publications have been serving the Amiga community.

The July issue is an excellent example. It contains a variety of music, art, and tutorials for graphic artists, an ongoing AREXX tutorial, programs for creating your own instruments and improving the Amiga's speech, news and editorial commentary, and an excellent freely distributable virus fighter that works on the A3000.

In fact, ZeroVirusIII is so good that it receives this month's PD program of the month award. It checks your machine for resident viruses, checks each disk as you insert it, checks files and directories for file-linking viruses (like the IRQ virus), lets you archive boot blocks, repairs disks and files infected by viruses, can learn to recognize new viruses, and can be iconified to a small window on the Workbench where it runs in background. ■

RESOURCES:

Zuma Group
6733 N. Black Canyon, Phoenix, AZ

ASDG
925 Stewart St., Madison, WI 53713

The Sterling Connection
Box 4850, Berkeley, CA 94704

Brown-Wagh Publishing
130-D Knowles Dr., Los Gatos, CA 95030

Virtual Reality Laboratories, Inc.
2341 Gandor Ct., San Luis Obispo, CA 93401

Gold Disk
2171 Dunwin Dr., Unit 13, Mississauga, Ontario, Canada L5L 1X2

Jumpdisk
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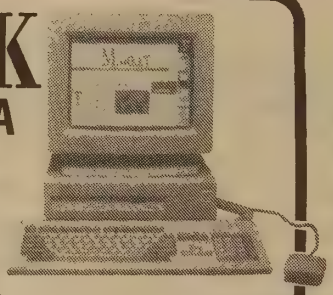

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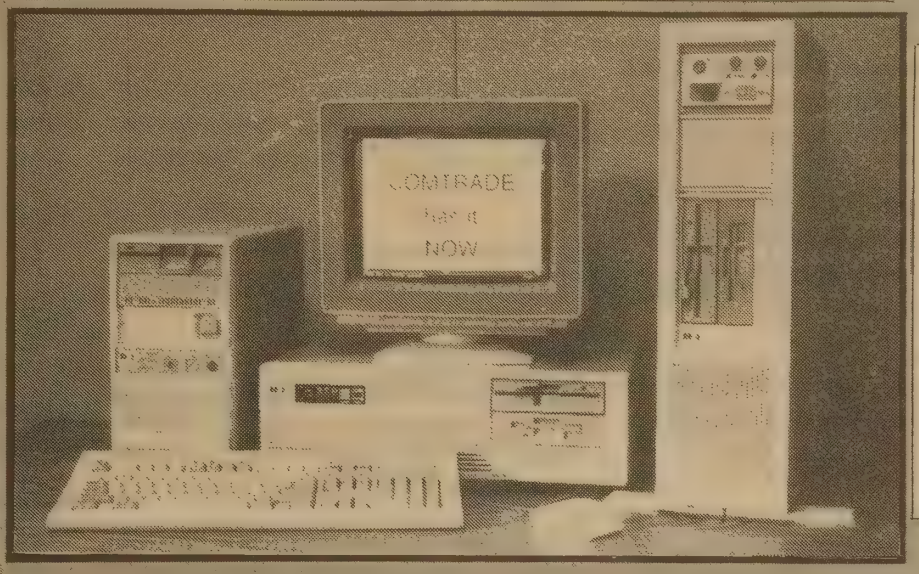

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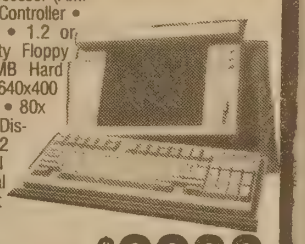

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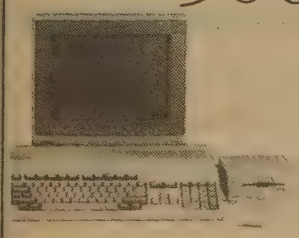

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- Amiga Vision Software
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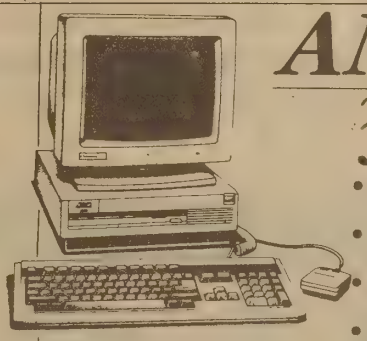

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July 24–27 Finance For Non-Financial Group, Department And Project Managers Course. San Diego. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 24–27 Hands-on Datacomm And Networks Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 24–27 Microprocessor Troubleshooting Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 24–27 Network Cabling And Wiring Techniques Course. San Diego. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 24–27 Object-Oriented Design And Programming: A Hands-on Workshop. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 24–27 Software Requirements And Design Specifications Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

July 28 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

July 30–August 1 Improving The Human-Computer Interface: Techniques And Tools For Development Course. Los Angeles. UCLA. Call: (213)206-2815.

July 31–August 3 The Application Of Fault Tolerance Technology Course. Los Angeles. UCLA. Call: (213)206-2815.

AUGUST

August 4 Computer Swap. Los Angeles. Computer Swap. Call: 1-800-433-7469.

August 4 Giant Computer Show & Sale. San Diego. Computer Showplex. Call: (619)741-9294.

August 5 Computer Show & Sale. Burbank. East-West Shows. Call: (415)388-8893.

August 5 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

August 5 Computer Show & Sale. Oxnard. East-West Computer Shows. Call: (415)388-8893.

August 8–September 12 Electronic Music II: Intro To MIDI Course. Los Angeles. UCLA Extension. Call: (213)825-9064.

August 12 Computer Swap. Glendale. Computer Swap. Call: 1-800-433-7469.

August 14 Future Trends In Computing Presentation. Los Angeles. UCLA PC Users Group And LA Computer Society. Call: (213)473-6668.

August 14–17 C Advanced Programming & Data Structures Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

August 14–17 Computer Graphics: Software Techniques & Hardware Components Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

August 14–17 Computer Network Architectures & Protocols Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

August 14–17 Multivendor Networking Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

August 15–17 Windows Conference & Exposition. Boston. CM Ventures, Inc. Call: (415)601-5000.

August 18 Computer Marketplace Show. Costa Mesa. Computer Marketplace. Call: 1-800-252-7927.

August 18 Computer Swap. Riverside. Computer Swap. Call: 1-800-433-7469.

August 19 Computer Show & Sale. San Diego. East-West Computer Shows. Call: (415)388-8893.

August 20–24 FoxPro Training Seminar. Los Angeles. MicroEndeavors. Call: 1-800-331-9434.

August 22–24 First Annual Macintosh Summit Conference. Santa Barbara. U.C. Extension. Call: (805)961-4143 (893-4143 after August 1).

August 25 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

August 26 Computer Marketplace Show. Reseda. Computer Marketplace. Call: 1-800-252-7927.

August 27–29 From Desktop To Design And Layout Workshop. Santa Barbara. U.C. Santa Barbara Extension. Call: (805)961-3816.

August 29–31 Tools Of The Trade Desktop Graphics Workshop. Santa Barbara. U.C. Santa Barbara Extension. Call: (805)961-3816.

SEPTEMBER

September 8 Computer Swap. Orange County. Computer Swap. Call: 1-800-433-7469.

September 9 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

September 9 Computer Show & Sale. Ventura. East-West Computer Shows. Call: (415)388-8893.

September 9 Computer Swap. Glendale. Computer Swap. Call: 1-800-433-7469.

September 9 Computer Show & Sale. Burbank. East-West Computer Shows. Call: (415)388-8893.

September 9–12 The 1990 Ashton-Tate Technical Conference. Anaheim. Ashton-Tate. Call: 1-800-695-TATE.

continued

Mind Over Macintosh

Training Classes

Los Angeles

Training classes are now being scheduled on new versions of Aldus PageMaker 4.0 and Quark XPress 3.0. These two desktop publishing programs include new features, functions and capabilities. Mind Over Macintosh bring classes to the client and schedules sessions for both staff and management. For information and scheduling, contact Justine Rosenhack, (213)829-2756. Mind Over Macintosh, 2909 Colorado, Suite B, Santa Monica, CA 90404.

Calendar Of Events *continued*

September 10–13 The Fifth Annual NetWorld Expo. Dallas. H.A. Bruno, Inc. Call: Annie Z. Scully or Mark Haviland, 1-800-444-3976.

September 15–18 First International Multimedia Conference. New York. MultiMedia Computing Corp. Call: 1-800-248-5474.

September 17–19 Presentations '90—Graphics & Multimedia Conference And Exposition. Long Beach. Presentations Products Magazine. Call: (617)290-0400.

September 17–20 Software Testing Course. Los Angeles. UCLA. Call: (213)206-2815.

September 22 Computer Marketplace Show. Long Beach. Computer Marketplace. Call: 1-800-252-7927.

September 23–28 Oracle 1990 International Users Week Conference. Anaheim. Oracle Corporation. Call: 1-800-441-4684 ext. 61.

September 29 Computer Marketplace Show. San Diego. Computer Marketplace. Call: 1-800-252-7927.

OCTOBER

October 4–12 Efficiency Beurs: International Trade Fair. Amsterdam. RAI Gebouw. Call: 020- 549-12-12.

October 6 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

October 7 Computer Marketplace Show. Reseda. Computer Marketplace. Call: 1-800-252-7927.

October 9–11 4th Annual Engineering Workstations Conference. Los Angeles. National Institute For Management Research. Call: (213)450-0500.

October 10–12 Imaging '90 Conference And Exposition. New York. BIS CAP International. Call: (617)982-9500.

October 10–12 Seventeenth International Information Management Expo & Conference. New York. Cahners Exposition Group. Call: Marilyn Harrington, (203)352-8477.

October 14 Computer Marketplace Show. Buena Park. Computer Marketplace. Call: 1-800-252-7927.

October 20 Computer Marketplace Show. San Mateo. Computer Marketplace. Call: 1-800-252-7927.

October 22–24 Electronic Messaging '90: Beyond Interpersonal Correspondence Conference. San Francisco. Electronic Mail Association. Call: (703)522-7111.

October 27 Computer Marketplace Show. Pomona. Computer Marketplace. Call: 1-800-252-7927.

October 30–November 2 Hands-on PC Configuration & Troubleshooting Course. Los Angeles. Integrated Computer Systems. Call: 1-800-421-8166. ■

SEPTEMBER 23-28, 1990

1990 International Oracle User Week

Anaheim

The 1990 International Oracle User Week is an opportunity to meet with over 6000 industry professionals from around the world and discuss approaches in development and end-user applications. During the week there will be seminars with Oracle's major technical developers, SIG meetings, classes and product presentations. Featured speakers include Lawrence J. Ellison, president, CEO and chairman of Oracle, and Richard A. McGinn, president of AT&T Computer Systems. Contact: 1990 International Oracle User Week Registration, Conference & Planning Group 50P-6, 20 Davis Dr., Belmont, CA 94002. 1-800-441-4684, ext. 77. Fax (415)506-7106.

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AUGUST 4, 1990

CSUN, NORTH CAMPUS
AUGUST 11, 1990

GLENDALE CIVIC AUDITORIUM
AUGUST 12, 1990

RIVERSIDE CONVENTION CENTER
AUGUST 18, 1990

ORANGE COUNTY FAIRGROUNDS
SEPTEMBER 8, 1990

GLENDALE CIVIC AUDITORIUM
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USER GROUP NETWORK

BULLETIN BOARDS

213

Amiga Exchange BBS. (213)325-1796. 24 hrs., 9600. 50 megs. Sysop: Robert Takahashi. [Exp. #74.]

Beta BBS. (213)393-9777. BBS for DJ's, audio/videophiles, entertainment/DJ news and files. Sysop: Jason Lin. [Exp. #72.]

Drug Abuse Information (DIAMP). (213)825-3736. 8-N-1, 24 hrs., 300/1200/2400. Drug information, statistics, bibliographies, forums, e-mail, downloads, and uploads. Free membership, reg. requested. Sysop: Greg Cason. [Exp. #75.]

Kenny's Computer Club BBS. (213)432-0039. 8-N-1, 300/1200/2400. Word processing, database, and spreadsheets. Sysop: Kenneth Fonseca. [Exp. #73.]

La Mirada's The Modem's Delight BBS. (213)944-1221. 24 hrs., 300/1200/2400. Multi-interest files, doors, games & fun. Running PCBoard 14.2/E3, email. Sysop: Ronald Dishon. [Exp. #72.]

LAAUGLine. (213)387-1002. 24 hrs., 300/1200/2400. Sysop: Tom Irwin. [Exp. #73.]

LAMG (Los Angeles Macintosh Group). (213)559-MACS. 8-N-1, 24 hrs., 300/1200/2400/9600. 100 megs online of Mac Rumors, news reviews, unclassified ads, discussions, observations, testimonials, and public domain software. Sysop: Reed Hutchinson. [Exp. #73.]

Lunatic Laboratories Unlimited. (213)655-0691. 1200/2400. Cyberpunk, occult, mind-expansion, and suppressed technology information. Sysop: The Mad Alchemist. Voice: (231)658-7473. [Exp. #72.]

Lynzie's Motherboard. (213)650-0519. 8-N-1, 24 hrs., 300/1200/2400. 16 lines, group & private chat, email, 40 public forums, matching, local social events. Sysop: Lynzie Flynn. [Exp. #72.]

Midnight Express. (213)878-6700. 8-N-1, 24 hrs., 300/1200/2400. Free access, unlimited e-mail, graffiti, games, discussions. Sysop: Justin Case. [Exp. #72.]

Miracle Programmer's Oasis. (213)730-0602. 8-N-1, 24 hrs., 300/1200/2400. Structured to teach all programming languages. Sysop: Louis. [Exp. #73.]

Mt. Hollywood BBS ICN. (213)666-6937. 8-N-1, 24 hrs., 300/1200/2400/9600. Email, up/down load, echo message areas, AA-BBS. Sysop: John Jansen. [Exp. #73.]

Offworld. (213)651-5588. 24 hrs., 300–38400. VSR/HST/MNP/v.32 an electric sanctuary for social revolution. [Exp. #72.]

OS/2 BLUEzz. (213)494-6168. 8-N-1, 24 hrs., OS/2 only (i.e., no "D-word" support). Sysop: John Krogh. [Exp. #73.]

The Lord's Board. (213)782-6836. 8–N–1, 24 hrs., 300/1200/2400. Public domain and shareware programs, complete KJV Bible, Christian games, IBM Utilities online calendar of events. [Exp. #74.]

The Lords Board. (213)782-6936. 8-N-1, 24 hrs., 300/1200/2400. NEW! Serving South Bay and beyond with technical talk and Christian info, news and reviews. Sysop: Paul & Agena Aziz. [Exp. #73.]

the orginal off off broadway bbs. (213)453-7038. 8-N-1, 24 hrs., 300/1200. Non-subscription, text files, messages only. [Exp. #74.]

Zog's Cavern BBS. (213)461-3872. 8-N-1, 8 pm–7 am, Mon-Sat, all day Sun, 300/1200/2400. On-line games, netmail, OS9 & Coco SIGs. Sysop: Alan Sheltra. [Exp. #72.]

619

DataByte Computer Services. (619)367-9208. 24 hrs., Wildcat, Tomcat, USR-HST, Free, DPT Graphics. Sysop: Jim Kornegay. [Exp. #76.]

The Stumps BBS. (619)367-3420. 8-N-1, 24 hrs., 300/1200/2400/9600. SVGS & VGA Graphics, util., games and more! IBM & compatibles. Sysop: Mike Brown. [Exp. #72.]

714

Americom. (818)967-3108. 10:00pm–8:00am, 300/1200/2400. Multi-topic, special interest in HAM/SWL and scanners, home video/audio and medicine. [Exp. #73.]

Astro Atari BBS. (714)554-4658. 24 hrs., 300/1200/2400. Atari ST & 8 bit, 120Mb, pictures, games, utilities, DTP, Programming SIGs. [Exp. #72.]

Blue Mango Cafe. (714)449-9280. 24 hrs., 2400. Support all, spec. Atari. Putting communication back into telecommunication. Sysop: Captain Spock. [Exp. #72.]

Cash Cow BBS (N. Orange County Computer Club). (714)962-1857. 24 hrs., 2400. 4th year of operation, specialize in business, Lotus, applications. Sysop: Vance L. Jochim. [Exp. #76.]

Color America, Inc. (818)963-3537. 8-N-1, 24 hrs., 300/1200/2400. Message board and shareware. Sysop: Dick Hagene. [Exp. #73.]

DarkSword BBS. (818)339-4244. 24 hrs., 2400. Messages networked, email, games, and SIGs. Sysop: Raistlin Majere. [Exp. 76.]

Happy Trails BBS. (714)547-0719. 2400/9600. MS-DOS only, multiuser, multi-line, CD-ROM drive, SIG groups. Sysop: Don Inglehart. [Exp. #73.]

JADE South BBS. (714)545-0409. 24 hrs., 300/1200/2400. New user downloads. Sysop: Tracy Justus. [Exp. #72.]

MicroCom BBS. (714)639-7725. 24 hrs., 300/1200/2400. Multi-line, multiuser games, email, SIGs, online shopping, dating. [Exp. #73.]

Mysteria. (818)353-8891. 300/1200/2400. Metaphysics, text, MS-DOS, CP/M, echo-mail, 142Mb. Sysop: Phil Hansford. [Exp. #73.]

National Internal Audit BBS (NIABBS). (714)962-1827. 24 hrs., 2400. Forum for professional internal auditors. Audit checklists, tips, etc. 4th year. Sysop: Vance L. Jochim. [Exp. #73.]

NOCCC BBS. (714)730-6743. 8-N-1, 24 hrs., 300/1200/2400/9600/14440. [Exp. #72.]

NOCCC Long Beach BBS. (714)423-5797. 8-N-1, 24 hrs., 300/1200/2400. [Exp. #72.]

OrnJuce BBS (ACAOC). (714)969-9053. 24 hrs., 2400. Extensive Atari support. [Exp. #72.]

SOCCC BBS. (714)964-1247. 8-N-1, 24 hrs., 300/1200/2400. [Exp. #72.]

South Bay Commodore User Group BBS. (714)858-2868. 300/1200/2400. [Exp. #74.]

System III. (714)830-1884. 8-N-1, 24 hrs., 1200/2400/9600. 300+ megs, national mail, online doors. For IBM and compatibles, distribution site for Mycroft Doorware. Sysop: Dave Safley. [Exp. #74.]

The Desktop BBS. (714)491-1003, 898-7269. 8-N-1, 24 hrs., 2400. Mac discussion, UL/DL, 2 lines. Sysop: Mark Murphy. [Exp. #73.]

The Flight Deck BBS (714)979-8444. 24 hrs., 1200/2400. Online games and movies, text files and messages. Sysop: A.W.K. [Exp. #73.]

The Punkin Duster BBS. (714)522-3980. 8-N-1, 24 hrs., 1200–14400. USR Dual Standard V.32, Carrying over 180 echoed message conferences and a large selection of IBM files. Sysop: Dave Ludwig. [Exp. #73.]

805

Surfside Adult Interaction BBS. (805)984-8876. 24 hrs., 300/1200/2400. Multi-line, chat, email, matchmaker, database, PD libraries. [Exp. #72.]

Y–NOT? (805)985-1657. 8-N-1, 24 hrs., 1200/2400. SW & PD fields, ads, messages. Sysop: Frank Segesman. [Exp. #74.]

Y–NOT? Annex. (805)985-5699. 8-N-1, 24 hrs., 1200/2400. Games and messages. Sysop: Terry Lee. [Exp. #74.]

818

ACCESS LA! California's Favorite Adult BBS. (818)859-8128. 8-N-1, 24 hrs., 300/1200/2400. Live chat, email, games, giant message bases, tons of software. Voice: (818)357-9570. [Exp. #72.]

AEC-Online. (818)360-7022. 8-N-1, 24 hrs., Professional AutoCAD users forum, messages, ACAD specific files, chat, online ACAD help. Sysop: Lorne H. Steiner. [Exp. #74.]

Hard Ball PCBoard. (818)718-0610. 8-N-1, 24 hrs., 1200/2400. Large filebase, PC-SIG disk library online, downloadable message board, online doors and games. Sysop: The Umpire. [Exp. #74.]

The Party Line/Dial-Your-Match #1. (818)842-6900/842-3322. Online since 1981, run by the originator of the matchmaking BBS, Greg Collins. [Exp. #74.]

Tin Shack BBS. (818)992-3321. 24 hrs., 1200. The BBS for college students, faculty and new users. Sysop: Guy Nohrenberg. [Exp. #74.]

Valley Apple BBS. (818)782-6471. 24 hrs., 300/1200/2400. UL/DL, public domain, games. Sysop: Maurice Bernstein. [Exp. #73.]

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USER GROUPS

ACCOUNTING

ACCPAC & Open Systems Users Group. Meetings: 1st Tues., 7:00 pm, Irvine. Call: Bob Jaffer, (714)962-4760. Speakers and demos. [Exp. #73.]

AMIGA

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wed., 7:30 pm, Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Many SIGs, Rookies, DTP, Video, Monthly PD disks. Call: Kip Hammond, (213)390-3010. [Exp. #76.]

South Orange Commodore Klub. Meetings: 3rd Sat., 9:00 am, Union Federal, 23688 El Toro Rd., El Toro. All Commodore and Amiga users. Call: Don, (714)830-2430. [Exp. #77.]

ATARI

Atari Computer Association Of Orange County. Meetings: 2nd Sun., 12:30 pm, Tustin Senior Citizen's Center. Call: Rick, (714)996-8509. [Exp. #75.]

NOCCC Atari SIG. Meetings: 1st Sun., Chapman College, Wilkinson Hall, rm. 221. (714)633-4665 or 552-5185. [Exp. #75.]

APPLE

Valley Apple Computer Club. Meetings: 3rd Tues., 7:30 pm, Union Federal Savings and Loan, 7040 Sepulveda Blvd. Call: Dr. William H. Trent, (818)988-1752. [Exp. #75.]

COBOL

Micro Focus COBOL & Macola Developer/User Group. Meetings: 2nd Thurs., 7:00 pm, Torrance. Speakers, demos, tips and techniques. Call: Wilson Mar, (213)539-3050. [Exp. #76.]

COMMODORE

C128 West Commodore 128 User Group. Meetings: Free membership, no dues. Meets in Covina and Santa Monica. Call: (818)331-1589 or 892-3859. [Exp. #76.]

Commodore Technical Users Group Of Orange County—CTUG Of Orange County. Meetings: 4th Sun., 11:00 am, Murcery Savings And Loan, 1095 Irvine Blvd., Tustin. Call: Lou Palush, (714)532-1802. [Exp. #75.]

South Bay Commodore User Group. Meetings: 3rd Thurs., 7:00 pm, Mercury Savings and Loan, 22939 Hawthorne Blvd., Torrance. Call: (213)324-8357, or BBS (213)545-8653. [Exp. #77.]

DATAFLEX

DataFlex Professionals Guild. Meetings: 1st Sat., 8:30 am, Cinesound, 915 N. Highland, Hollywood. Call: Robert Ward, (213)382-4420. [Exp. #75.]

DBASE

The dBASE Language Professional Developers Group—DLaP. Meetings: 3rd Wed., 7:30 pm, Community Room of the Westside Pavilion. Call: Therese Padilla, (213)450-4399. [Exp. #75.]

UCLA PCUG dBASE SIG. Meetings: 3rd Wed., 7:30 pm, UCLA, Franz Hall rm. 1571. Call: Tom Rombouts (213)538-7108. [Exp. #75.]

Valley West dBASE Users Group. Meetings: 3rd Mon., 7:00 pm, Blue Cross of CA, 21555 Oxnard St., Woodland Hills. (818)988-6337. [Exp. #75.]

DESKTOP PUBLISHING

Southern California Ventrua Publisher User Group. Meetings: last Wed., 7:00 pm. (818)955-5830. [Exp. #75.]

EPSON

Epson User Group of Orange County. Meetings: 3rd Sat., 10:00 am, Westerm Federal Savings & Loan. Call, Bill Lafitte (714)548-1741 or 974-5072. Support, parts, library—QX, PX, Equity, VALDOCS, CP/M, MS-DOS. [Exp. #72]

San Fernando Valley & Los Angeles Epson QX User Group. Meetings: 3rd Mon., 7:30 pm. Supports QX-10, QX-16, PX-

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USER GROUPS

8, Valdocs, CM/P. Call: Dave Goldman, (818)717-1768 or 341-7632. [Exp. #76.]

IBM & COMPATIBLES

Channel Island PC Users Group. Meetings: 2nd Sat., 9:30 am, Camarillo Community Center, 1605 Burley St. Meetings feature help sessions, speakers on hardware, software, shareware, library, SIGs newsletter. Call: Bob, (805)983-4741. [Exp. #77.]

Color America, Inc., MS-DOS SIG. Meetings: 3rd Thurs., 7:30 pm, Charter Oak High School, 1430 E. Covina Blvd., Rm. B7, Charter Oak. Call: Bob Marvin, (714)861-2949. [Exp. #76.]

Greater South Bay Users Group. Meetings: 2nd Wed., 7:30 pm, Fellowship Hall, rear of Christ The Lutheran Church, 2706 W. 182nd St., Torrance. SIGs, BBS, newsletter, library and more. Call: Pamela Harrison, (213)373-4465. [Exp. #76.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed., 7:00 pm, Los Altos Methodist Church, 5950 E. Willow St/Woodruff Ave., Long Beach. Call: Jim Wells, (213)439-7114. [Exp. #76.]

North Orange County Computer Club (NOCCC). Meetings: 1st Sun., Chapman College. Thirty SIGs, including three on IBM, database, word processing, AI, investors, Lotus, OS/2 and graphics. Call: (714)998-8080. [Exp. #75.]

Orange Coast IBM-PC User Group. Meetings: Last Sat., 9:00 am, Orange Coast College, Costa Mesa. Call: Robin Clark, (714)843-2048. [Exp. #76.]

Orange County IBM-PC Users Group. Meetings: 2nd Tues., 7:00 pm, Computer Learning Center, 1240 S. State College Blvd., Anaheim. Call: Mike Lyons, (714)774-3236. Meetings feature guest speakers, sharing tips and problems, access to club library and newsletter. [Exp. #76.]

Pasadena IBM Users Group. Meetings: 3rd Wed., 6:30 pm, Caltech, Bridge bldg., rm 201. Call: Steve Bass, (818)795-3200. 3 hr. meetings have speakers on hardware and software topics including "tips and tricks," "stump the stars" and vendor demonstrations. Includes group library, newsletter, SIGs and BBS. [Exp. #76.]

South Orange County Computer Club (SOCCC). (714)554-1709. [Exp. #75.]

SWPC User Group. Meetings: 3rd Sat., mornings, various places. Call: Christine Tripp, (213)935-4105. [Exp. #76.]

System Users Network. Meetings: 4th Sun., 4–6 pm, Gardena YMCA, 1700 Redondo Beach Blvd. Call: Victor, (213)719–8659 or Burrell, (714)891-8843. [Exp. #77.]

KAYPRO

KAYOS Kapro User Group. Meetings: Last Mon. of even months, 6:30 pm, El Segundo. Call: Margot, (213)379-8339. [Exp. #76.]

The Lakewood/Long Beach KUG (Kaypro Computers). Meetings: 2nd Wed., 7:30 pm, Mid Cities Bank, 9025 E. Artesia, Bellflower. Call: Mark Motley, (213)928-9096. [Exp. #76.]

West Los Angeles Kapro User Group. Meetings: 3rd Tues. of odd months, 6:30 pm, Mar Vista. Call: Barry, (213)390-3851. [Exp. #76.]

LOTUS & BUSINESS

Lotus and Business SIG. Meetings: 1st Sun. (verify at (718)998-8080), 11:15 am, Chapman College, City of Orange, Hashinger Hall. Call: Vance Jochim, (714)962-2517. SIG of 1200-member N. Orange County Computer Club. [Exp. #76.]

MACINTOSH

Pomona Valley 99ers. Meetings: 2nd Mon., 7:00 pm, First Federal, 9900 Central Ave. Call: Bill Harms, (714)628-1334. [Exp. #74.]

San Gabriel Valley Mac Users Group. Meetings: 1st Thurs., 7:30 pm, 285 E. Walnut, Pasadena Central Library Auditorium. Call: Char Rice, (213)684-4266. [Exp. #76.]

SBAMUG—South Bay Apple Mac User Group. Meetings: last Wed., 7:30 pm, Pacific School, 1214 Pacific Ave., Manhattan Beach. (213)316-7738. [Exp. #75.]

Whittier Area Mac Users Group. Meetings: 2nd Sat., 10:00 am, 11818 S. La Mirada Blvd., Granada Heights, Friends Church, rm C-21. Call: Char Rice, (213)947-2447. [Exp. #76.]

TEXAS INSTRUMENTS

Texas Instruments Professional Computer Users Group. Meetings: 4th Thurs., 55 Temescal Ter., San Francisco. Call: Thor, (415)386-5237 or Steve, (415)968-9543. [Exp. #75.]

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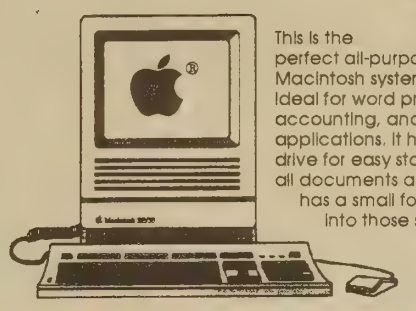

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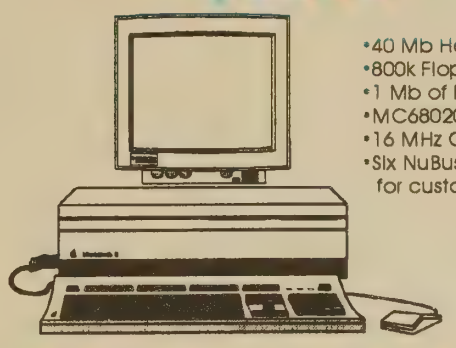

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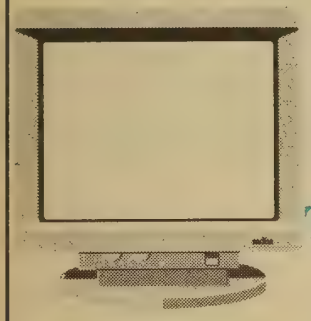

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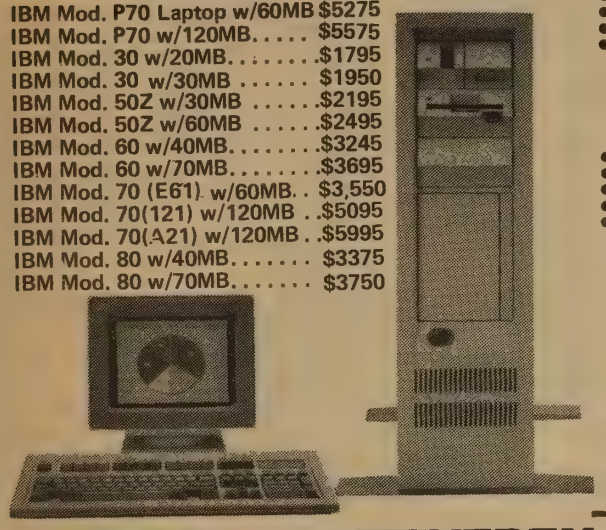

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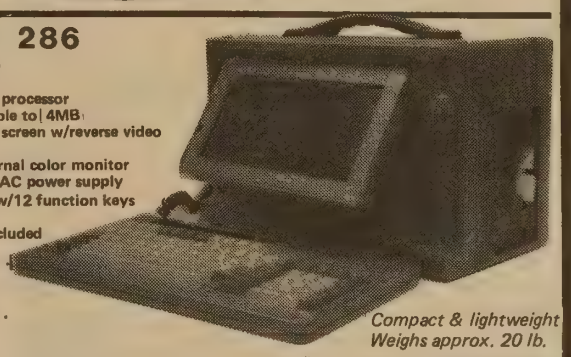

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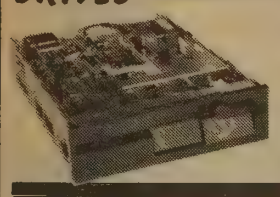

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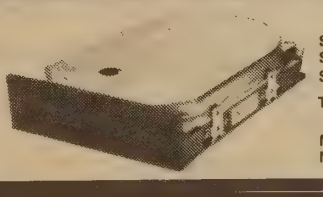

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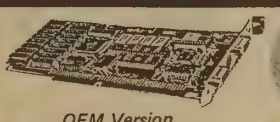

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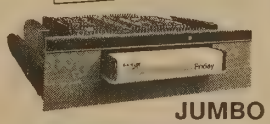

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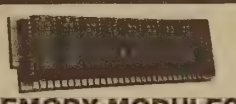

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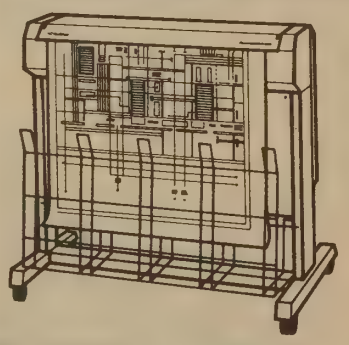

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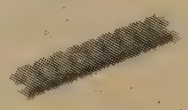

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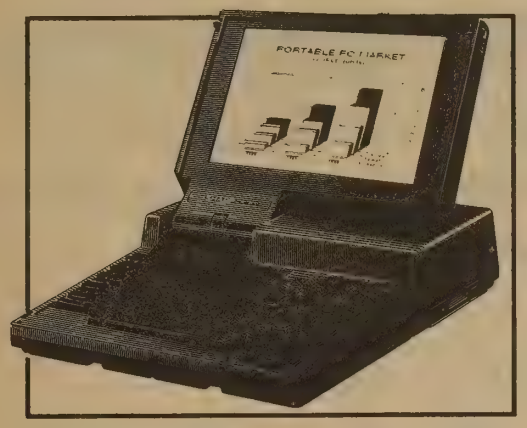

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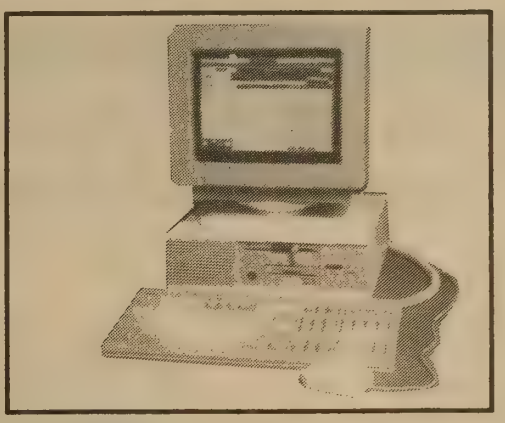

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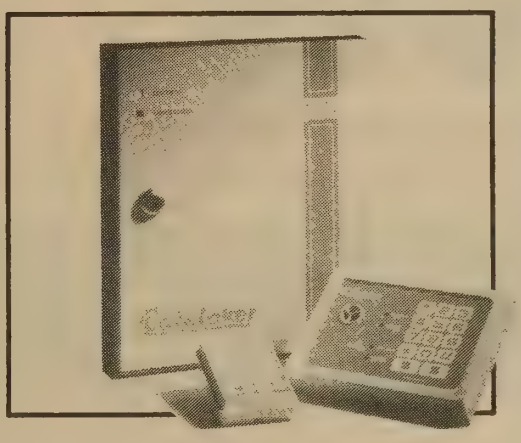

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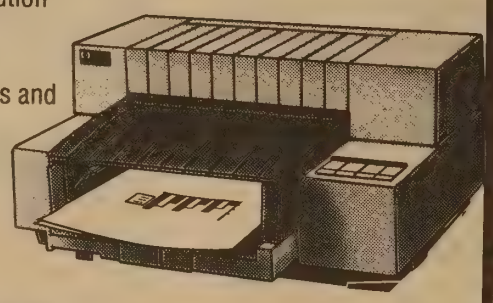

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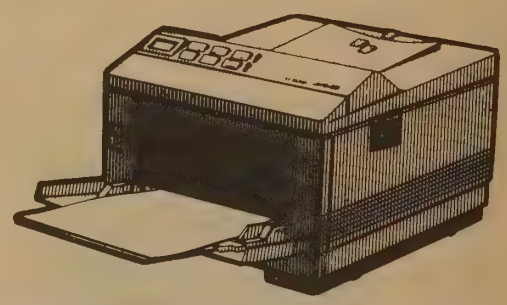

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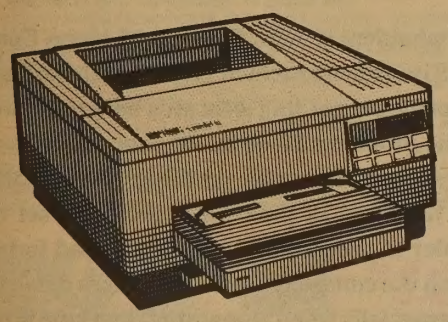

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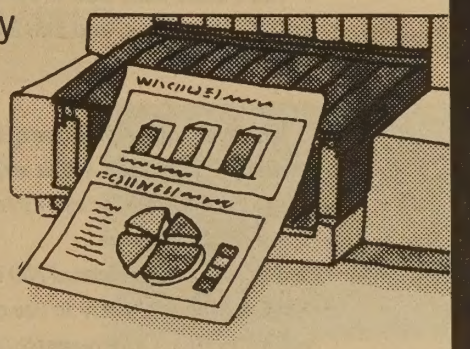

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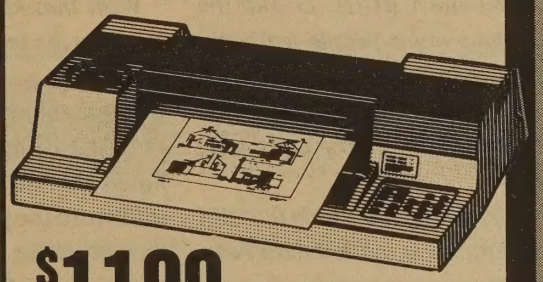

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Sometimes The Mail I Get Is More Interesting Than The Columns I Write. Sometimes Not.

BY JOHN C. DVORAK

I get tons of mail and wish I could answer it all personally. Instead I find a way to print the funniest or most interesting letters in columns like this during the slow summer months. I try not to do this too often lest people discover that the reader mail is more interesting than my columns.

Let's start with Ben Meyers and his comments on new software, BASIC, Windows, and OS/2—all this said before the release of Windows 3.0.

The Windows API is one of the more complex in the whole computer industry. The OS/2 API is still more complex. Ditto for the Mac, but there have been Mac tools to relieve some of the programmer's tedium since fairly early on.

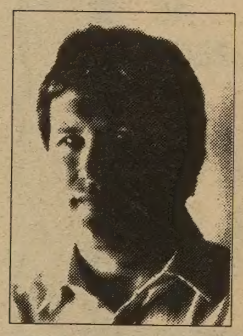
Microsoft has released NO Windows programming tools beyond the SDK, which is clumsy to use on good days. Even the Windows heavies admit to this. Only recently have third parties begun to ship development tools. At an early Windows 1.03 Developer's Seminar, I asked

DVORAK'S LAST COLUMN

Steve Ballmer about Windows tools to generate interfaces and programs, and he responded that Microsoft was aware of the issue and was working on it. Really?

The consequences of the absence of tools are the relative absence of Windows apps and the slow growth of Windows as a GUI. (Despite the trillions of copies of Windows shipped, how many people really use Windows a lot, even now?) The entry cost to bring a Windows app to market is very high compared to non-Windows apps, in terms of hardware cost, software cost, steep learning curve, long debugging time, media costs (many diskettes), etc.

Your article combined with the above lead me to conclude that Bill has learned well from IBM how to manipulate a market with Fear, Uncertainty, and Doubt. Mostly the latter two, which is what the Microsoft Windows strategy has been all about in hindsight. Simultaneously promoting a standard and withholding tools from the market is a great way to create FUD about GUIs.



John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

The above comments remind me that there isn't even a BASIC for Windows, is there? Moving onward, Paul Hoffman sends this quick observation:

You can tell that there is a drug problem in the advertising industry. On the outside of a piece of junk mail from* UNIX TODAY! *"Introducing a newspaper as exciting as the market it covers!"

Greg Dunn on Networks:

Normally I don't read the columns in *PC Week*, but my eyes just happened to fall on the following, and I thought of you immediately.

Cheryl Currid says: "Trying to implement any semblance of conformity or consistency in a stand-alone PC environment is an impossible dream. There are simply too many Freddie Fix-its out there. Freddie, a well-meaning fellow, has a penchant for tweaking and tinkering with the software or menus. Then he tries to help out by tweaking the PCs of five or six other people in his department—except they aren't all the same. So you end up with no two PCs set the same way. This can cause real problems for the PC support staff debugging a problem when something goes wrong.

"On a LAN, however, you can keep Freddie from fouling up too much. You've got the option of giving him read-only access to the software applications areas and no access to his neighbors' configuration files."

John, on behalf of upholders of Law, Order, and Menu Consistency everywhere, I call on you to repent of your recalcitrant, anarchistic, indefensible position regarding local area networks. Surely you can understand the problems faced by PC support staffs who cannot be expected to support users who do things like establish a non-standard default directory in their 1-2-3 program, set their screen background color to green in MS Word, or—God forbid—write personal letters on the company's PC. This makes debugging problems impossible, especially when Something Has Gone Wrong.

An amusing observation comes from PR whiz Wes Thomas:

Bush says, "Saying no to drugs doesn't make you a nerd or a loser." I guess that means nerds should start taking drugs to avoid being seen as outcasts?

I think I'll write an "unfair to nerds" letter to Bush.

With that kind of attitude by our leaders, no wonder America is losing to the Japanese, who glorify their nerds.

Neil Rubenking posted this memo on PC Magnet (on CompuServe go PCMAGNET at the prompt) after I had written a gripe column about hotels that do not provide any way for a traveller to hook a laptop modem to the phone. As an aside I should mention that I was amused recently when I attended the Computer Press Association Awards at the New York Ritz-Carlton and found all the phones hard-wired and unusable. When I asked maintenance about modems they couldn't figure out what I was talking about. Rubes.

Neil says, "Aw, it's not SOOOOO bad when you gotta scrape the phone wires and/or use 'gator clips. The REALLY REALLY bad ones are like the Meridien in Newport Beach. For whatever perverse reason, they have the whole room controlled from the phone—e.g. you want it warmer/cooler, you press a button on the phone. It doesn't use a standard phone jack. When I called the concierge to ask about it, he had a fit—'You didn't UNPLUG it did you? Oh, good, because if you DO it automatically checks you out of the hotel!' Yup, those are the worst. Far as I could tell, there was NO WAY to use a modem over a line like that! ON the other hand, the places that have a separate data line near the desk should get extra credit. Right off, the only one like that I can remember is the Chaminade in Santa Cruz."

It's true, these phones have no way of hooking to a modem as far as I can tell. Worse, the handset is square so you can't even put acoustic cups on the thing. It's unbelievable. ■

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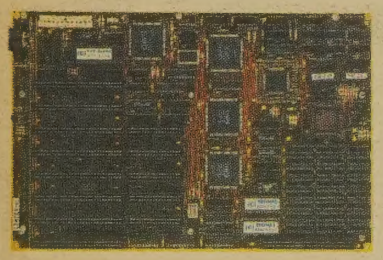

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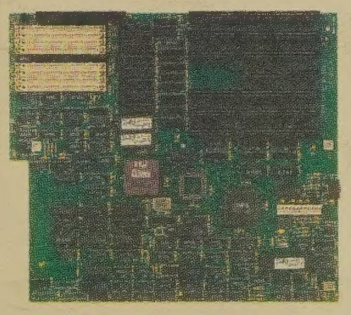

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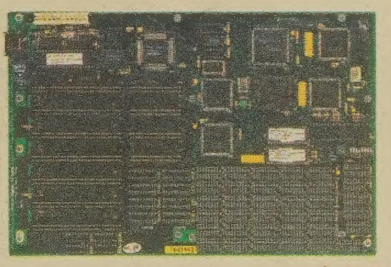

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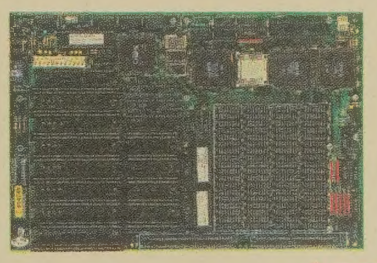

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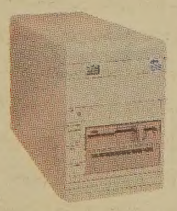

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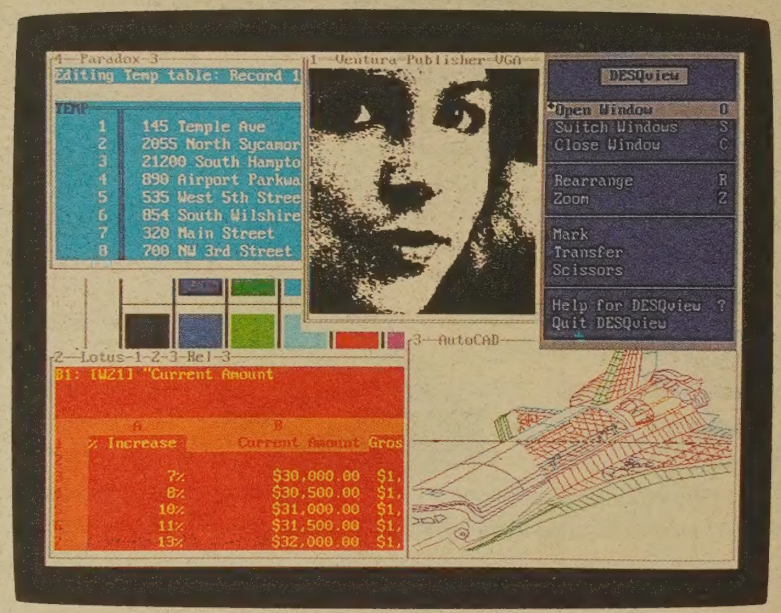

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DESQview System Requirements: IBM Personal Computer and 100% compatibles (with 8086, 8088, 80286, or 80386 processors) with monochrome or color display; IBM Personal System/2 • Memory: 640K recommended; for DESQview itself 0-145K • Expanded Memory (Optional): expanded memory boards compatible with the Intel AboveBoard; enhanced expanded memory boards compatible with the AST RAMpage; EMS 4.0 expanded memory boards • Disk: two diskette drives or one diskette drive and a hard disk • Graphics Card (Optional): Hercules, IBM Color/Graphics (CGA). IBM Enhanced Graphics (EGA), IBM PS/2 Advanced Graphics (VGA) • Mouse (Optional): Mouse Systems, Microsoft and compatibles • Modem for Auto-Dialer (Optional): Hayes or compatible • Operating System: PC-DOS 2.0-4.0; MS-DOS 2.0-3.3 • Software: Most PC-DOS and MS-DOS application programs; programs specific to Microsoft Windows 1.03-2.1, GEM 1.1-3.0, IBM TopView 1.1 • Media: DESQview 2.0 is available on either 5-1/4" or 3-1/2" floppy diskette.

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Quarterdeck

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405
(213) 392-9851 Fax: (213) 399-3802